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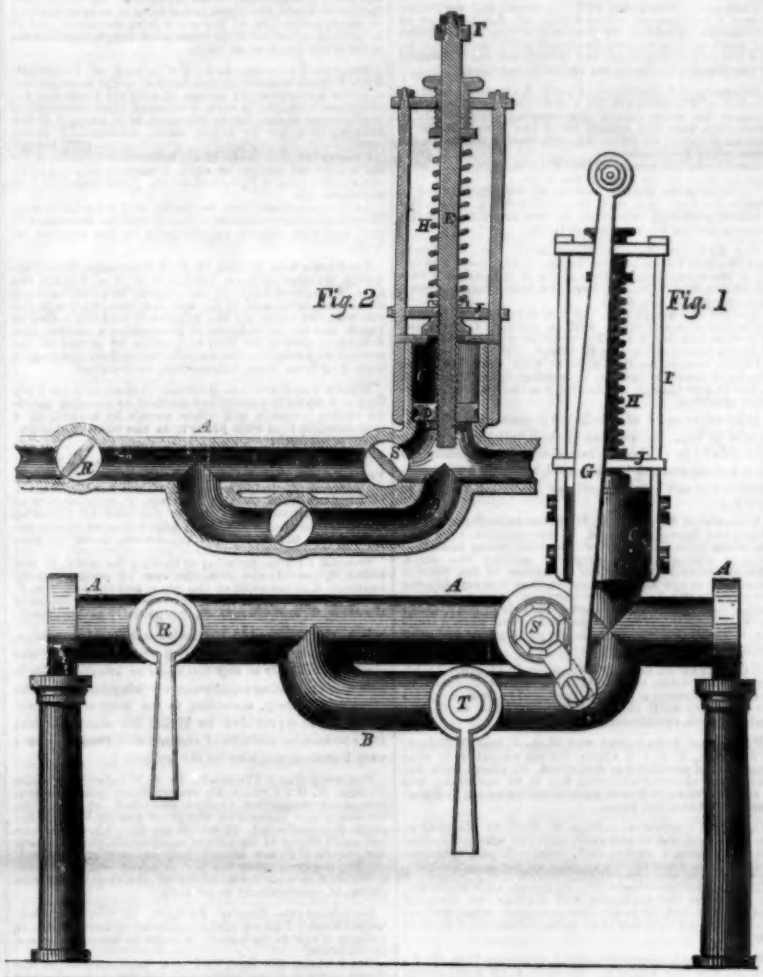
Improved Marine Governor.

It was a comparatively simple matter to conceive the propulsion of vessels by the power of a steam engine. The steam engine having been previously invented and put in practice for turning mill-work, it only remained to attach paddles to a shaft thus impelled and extending across the vessel, and the solution of the problem, the great solution which has done so much for human progress was at once in its crudest form achieved.

But Fulton was a skillful mechanic, and like his countrymen of later days, labored to adapt the heated monster, the breathing, *living* mass of metal, to its new situation on shipboard. Much has been done, and undoubtedly much yet remains to be accomplished before the steam engine, especially in those forms intended to impel vessels on the stormy ocean can, be pronounced absolutely perfect; and one of the greatest and most obvious wants in such situations at the present moment is a good and efficient governor.

The steam engine itself is an importation; but many of the best adaptations of engines and boilers to marine purposes have been the fruit of American brains and of American experience. That the problem of regulation is capable of solation is proved by the success of Silver's governor—a purely American device—now in use on the Collins' steamer *Atlantic*, and we believe, on several other large ships, with the effect of checking the engines with perfect certainty and very rapidly whenever they incline to "race," or to turn too rapidly. When, in a rough sea, the wheels are left nearly or entirely out of water, if only for a second, the engines, if unchecked, generate a very high velocity in the ponderous masses termed "racing," and when, under such circumstances, one wheel only is plunged suddenly under and stopped, the other acts like a fly-wheel, and aided by the still laboring engines at the cranks, is extremely liable to twist off the shaft. With all the care that is taken to control the throttle by hand in bad weather, the failure of a shaft or some other important portion of a marine engine, due to this cause alone, is by no means uncommon. The disabling of the *Atlantic* a few years ago, causing her to be almost given up for lost, is still fresh in the minds of our readers. The more recent failure of the *Tennessee*, causing a serious delay in the communication with the disturbed regions in Central America; the accident to the British steamer *America*, the French steamer *Vigo*, and many others which might be adduced, both American and foreign, can, like that of the *Atlantic*, be traced almost directly to the "racing" of the engines; and any device which proposes to obviate this difficulty without retarding the engines in the least at other times, is deserving of the very highest degree of attention. The device under notice promises this, and, as would appear from theory, with a degree of perfection as admirable as beautiful. It is not, in any case, bulky or noisy, requires little, or almost no attention, to keep it in perfect order, and in no case offers any sensible resistance, except when the speed of the engine exceeds a certain speed, for which the regulator may be set. For example, if, as is common on most of our large ocean steamers, the engines should make from twelve to sixteen revolutions per minute, the regulator properly adjusted is of no effect, until the engine starts forward at a speed equal to twenty or more revolutions in that time, when immediately, and before they can complete a half revolution, the admission of the steam is shut off almost tightly, and the engines, thus strangled, are fain very rapidly to moderate their behavior, and assume again such speed as etiquette requires.

WHEELER'S MARINE GOVERNOR.



This simple governor is the invention of Marshall Wheeler, of Honesdale, Pa., and was patented June 11, 1856. Its action is based on the diminution of pressure which unavoidably takes place in the steam pipe, whenever, by an extra speed of the engine, the steam is drawn from it faster than usual. It is well known that in every possible case the pressure at the extremity of a steam pipe nearest the engine is less than in the boiler, or, of course, the steam would not move through it; but if properly proportioned, the difference in pressure is very slight, not more than one-fourth of a pound per square inch, at full ordinary speeds, and still less when working slowly. But if, by any chance, the engines are allowed to work faster than usual, drinking at each revolution the full volume of steam, as before, the pressure is still more reduced, and the steam rushes through with still greater violence. The motion of the steam has no influence directly in affecting the movement of this mechanism, but the diminution of pressure is in such cases so considerable as to be very sensible.

The invention consists substantially in attaching a small cylinder at the side of the steam pipe, and supporting therein a piston to be acted on by the steam, which piston is so connected to a spring and to the lever of the throttle valve that so long as the pressure is up to a certain standard, or beyond it, the spring will be compressed, and the throttle valve held open, but whenever the engine "races," and lowers the pressure, the tension of the spring shuts the throttle.

In the drawings, fig. 1 is a side elevation, and fig. 2 a section through both the steam pipe, A, and the side cylinder, C. The elevation is represented as supported on stands. The ordinary throttle valve is denoted by R, the additional or automatic throttle valve by S, and a side throttle, which allows the fluid to pass around—extremely important in starting or working very moderately—is denoted by T, in the corresponding pipe, B.

D is the piston referred to, working freely in the cylinder, C. The piston rod, E, is supported and guided by the frame, I, and carries on its top a cross-head, F, from each end of which depend rods, G, which connect it to the extremities of short levers, provided for the purpose on the shaft of the throttle valve, S. The coiled spring, H, tends to hold the piston, D, continually down, which would keep the valve, S, nearly shut, but the pressure of the steam on the under side of D tends, to raise it, and hold the valve, S, wide open. Starting the engine by opening the side valve T, the pressure in the pipe raises the piston, D, and after closing T, holds it continuously open, allowing the steam to pass freely and supply the engine, until, on attempting to "race," or go faster than prescribed, the pressure lowers, and the valve, S, nearly shuts. The engines then incline to drag too slowly until the flow of steam through the small remaining opening at S fills up the pipe again to nearly its original tension, when D again rises, and all moves on as before. To avoid this too slow motion of the engines after each action of the governor, it may be well to leave the side throttle, T, part way open, or provide for a quite liberal flow through S when as fully closed as it may be, either of which would probably have the effect desired. To aid in this matter the cross-piece, J, is made adjustable on the frame I, so as to check and stop the descent of D, and consequently the closing of S, point at any limit preferred.

The invention has not yet been put in use, but seems in the highest degree promising, and one which should be applied by a skillful designer on some of our ocean steamers, and fairly tested.

Any further information desired may be obtained by addressing Mr. W., as above.

One Hundred Tuns of Grass to the Acre.

Three weeks ago, on page 249, a statement was published taken from an English paper, of a farmer on Lord Derby's estate who had raised 100 tuns of *grass* on an acre of land by liquid manuring. We gave the statement in such a manner that any person *might* understand it was not upon our own authority. We have, however, received three or four letters expressing great surprise at it being published in our columns. It was stated, in the article referred to, that the crop raised was "Italian *grass*;" it was not *hay*, but green crop, and probably four or five cuttings were made during the year, as three cuttings of clover are not uncommon in England.

That 100 tuns of grass should be raised on an acre of land appears to be rather a tough or large story to credit; but if 76 tuns of turnips have been raised on an acre, why might not 100 tuns of grass be raised on the same area? In Johnston's Agricultural Chemistry, page 487, it is there stated that this quantity of turnips had been raised on an acre of land. From farms which thriftless cultivators had to leave because they had "worn them out," and from which they could not raise three bushels of wheat to the acre, other farmers have come after them and raised thirty bushels of wheat to the acre. We have known of such cases ourselves having occurred in the State of New York. But tell the former class of farmers of such results, and they look perfectly incredulous.

Lord Derby's farmer may have raised 100 tuns of green crop to the acre, by liquid manuring, as has been stated, and he may not. The quantity appears to us to be too great to credit, but not deny, because it is no more fabulous like than the 76 tuns of turnips mentioned by Prof. Johnston.

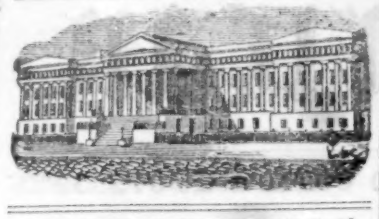
The Half Launch Finished.

The *Queen of the Pacific*, noticed last week as stuck when partially in the water, was finally set afloat during the night of Saturday the 11th ult., by jacking up the hull into a more inclined position, and reconstructing the ways. Thus repaired she slid off on the final trial without any assistance from tugs or derricks. The extra cost, in consequence of the mishap, is judged to have been about $4,000.

The Boston papers state that in a field near that city fire men have been digging for a week for hidden treasure, being led to believe they could find it there by a divining rod. No treasure has yet been discovered.

M. Garvini lately made an ascent in Paris in the largest balloon ever constructed. It was propelled by a screw, and had a rudder like a ship, but was not very successful.

A submarine cable has been laid across the Mississippi at St. Louis.



[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING APRIL 21, 1857.

CLOSING GAS RETORTS—N. Aubin, of Albany, N. Y.: I do not claim the box for introducing the materials for generating gas.

But I claim the cover, B, with the compound rim, a', fitting into the groove, a, for the purposes set forth.

TRAPS FOR RELIEVING STEAM PIPES OF WATER—John Avery, Jr., of Lowell, Mass.: A pipe coupling has been made so that the expansion of a long pipe may be made to close, or partially close, the opening between it and its follow. But it is not convenient, except for certain purposes, to have this long pipe, and a short one will not, on account of its limited expansibility, serve the purpose. Besides, this only regulates the flow of water or steam, and does not admit of allowing the water of condensation to pass off whilst the steam is retained, and is not a steam trap in the sense in which I claim one. I make no claim to such an arrangement.

I claim, in combination with the outer case, A, the inclosed mercury holder, B, and diaphragm, and openings, m K', for the purpose set forth.

DOOR SPRING—Gilbert L. Bailey, of Portland, Me.: I do not claim any of the described parts separately.

Neither do I claim in a door spring making the pressure greatest when the door is closed.

But I claim the use of the volute, coniform spring D, in connection with post, A, lever, L, and guide, X, the whole arranged and operating substantially in the manner and for the purpose set forth.

OX YOKES—Isaac K. Bennett, of Narrows, Pa.: I claim the pinions, a a, on the pivots of the low blocks, in combination with the racks into which they gear, operating substantially in the manner and for the purpose specified.

CUTTING VENEERS—Gilbert Bishop, of New York City: I claim constructing the knife in sections, each having alternate smooth and toothed cutting edges attached together and arranged and supported as described.

EXCLUDING AIR FROM LIQUORS ON TAP—Absolam F. Boyd, of Muskingum co., O.: I claim the application the bag, B, to a cask or barrel, as shown and described, for the purpose of preserving the flavor of liquors by excluding the atmosphere from them when the cask is on "tap," as described.

WASTE WAY IN FAUCETS—James E. Boyle, of Richmond, Va.: I claim the recess, v, and orifice, c, in combination with the channels m c, when constructed and arranged in relation to the ordinary component parts of stop cocks, in the manner specified.

BUTTONS FOR PANELS OF FENCES—Wm. B. Burnett, of Lyons, N. Y.: I claim the turn button clamp, or its equivalent, for connecting the trays of a portable fence, constructed, arranged and operating substantially as set forth.

CASE HEATERS—Simeon Burgess, of Wayne, Pa.: I claim combining with the fire pot, B, the encompassing hearth, A, with the adjustable pins for securing casks of different sizes in a concentric position, as set forth.

CHIMNEY DAMPERS—Augustine Campbell, of Philadelphia, Pa.: I claim the angular frame provided with a series of valves or vanes, d d, arranged, constructed, and operated substantially in the manner set forth and for the purpose specified.

AWL HAFT—Nathan S. Clement, of Worcester, Mass.: I claim an awl haft constructed as set forth, having the chamber for spare awls on the same end with the gripping jaws, and when closed in the manner specified.

GAS REGULATORS—Robert Cornelius, of Philadelphia, Pa.: I claim, first, the employment of a spring box or boxes composed of two plates of corrugated metal, as shown, and placed intermediately, so as to communicate on one hand with the gas in the main chamber, I, and on the other hand with the branch chamber, U, being separated by throttled openings, s s' and V V', in the manner and for the purpose set forth.

Second, the employment of the valve, R R', in combination with the spring box for regulating the flow of gas, these being constructed and operating as and for the purposes substantially as described.

HAND SEED PLANTERS—Thomas Crane, of Fort Atkinson, Wis.: I claim the combination of the pivoted and spring-actuated block, a, with the grooved and perforated sliding slat, b, substantially in the manner and for the purpose set forth.

I claim also the combination of spring, d, with the grooved and perforated sliding slat, b, in such a manner that the inclined aperture, n, in the back of the planter will operate said spring, substantially in the manner and for the purpose set forth.

HAND SEED PLANTERS—John Decker, of Sparta, N. J.: I am aware that reciprocating perforated slides for planting or distributing seed have been used, and I do not claim such separately, or in themselves considered.

But I claim the slides, b b, fitted in the box, B, and placed relatively with the hoppers, A A', as shown, and the plate or clearer, f, attached to the block, d, when the above parts are combined and arranged so as to operate conjointly, as shown, for the purpose specified.

[This hand seed planter has two hoppers, a seed elevator with two slides, and a clearer fitted within a box, which has three passages. It can plant two different kinds of seed at once, such as corn and pumpkins, &c., in one hill, or seed and some fertilizer. The clearer also prevents choking. It is a good improvement.]

BUSTLES—Alex. Douglas, (assignor to Messrs. Douglas & Sherwood,) of New York City. Ante-dated Jan. 20th, 1857: I claim the combination of the elastic stripe, A, the steadying cloth, B, or its equivalent, provided with straps or fastenings, D, and the adjusting cord, C, substantially as described and for the purpose specified.

[This invention makes this indispensable portion of feminine wearing apparel adjustable in dimensions to suit the convenience of the wearer. The dress is supported to an extent controlled by the cord, so as to give any amount of swell desired, while it retains all the lightness, coolness, and other desirable qualities belonging to modern improved skirts.]

BLOCKING HAT BODIES—Wm. A. Penn, of New Milford, Conn.: I claim the cylinder, g, placed loosely on the spindle or arbor, H, and resting on the spring, h, in combination with the rods or jaws, K K, the above parts being arranged substantially as described, whereby the hat body may be stretched and adjusted snugly around the hat block.

[This is a useful improvement in blocking felted hat bodies. The combination and arrangement of the devices described allow of the hat bodies being put on very expeditiously, and blocked—put into proper shape—in a superior manner.]

LIME KILNS—Aaron Jeffries, of Alleghany co., Pa.: I do not claim the form of the stack above the arches in the interior.

But I claim the combination and arrangement of the three furnaces, A B C, with the cooling or draft flues, b b b, when the same are constructed and arranged in relation to each other within a hexagonal stack, in the manner and for the purpose set forth.

ROPE MACHINES—Harvey W. Fowler, of Hoosick Falls, N. Y.: I claim, first, the stationary disk, F, arranged in relation to the layer shaft, C, and the spider, E, in the manner described, for the purpose of communicating motion to the flyers, h, through the flyer pulleys, f, as set forth.

Second, arranging the series of flyer shafts, g, radially to the layer shaft, C, and revolving them when the layer shaft is revolved, so as to give the proper degree of twist to the threads or strands as they leave the spools or bobbins in the flyers, by the peripheries of the flyer pulleys, f being kept in contact with the face of the stationary disk, F, the said pulleys being adjustable nearer to or further from the center of the layer shaft, to decrease or increase the speed of the flyers, and through that to give a less or greater degree of twist to the thread or strand, as described and set forth.

MESSENGER SHACKLE BLOCKS—George Gilmour, of Chelsea, Mass.: I claim the said messenger shackle block, or combination and arrangement of the sheaves or pulleys, the forked pawl, the rollers and the chain space or passage, substantially as specified.

I also claim hinging or jointing the parts, C C, and the pawl to the remainder of the frame, in order that the roller and pawl may be turned towards the sheaves of the pulley, as specified.

I also claim combining with the pawl and the pulley frame a mechanism substantially as described, or its equivalent, by which, by pressure of the chain against the pawl, such pawl may be caused to lift the parts, C C, and the roller, in manner and to facilitate the movement of the shackle block on the chain, as specified.

BURNERS OF BURNING FLUID LAMPS—Charles A. Greene, of Philadelphia, Pa.: I do not desire to lay any claim to the employment of a supplementary wick, in connection with the lamps, or to the employment of plaster of Paris, or other non-conducting substance for surrounding the reservoir.

Neither do I desire to claim the exclusive use of a tapering spur for penetrating the wick.

But I claim the hollow burner, G, with its rounded or hemi-spherical cap, and its projection, g, when the whole is rendered adjustable to the main tube, in the manner and for the purpose set forth.

TEA KETTLES, &C—Jas. Greenhalgh, Sen., of Waterford, Mass.: I do not claim having a wire pass from the top of the cover through the handle of the culinary vessel, so that by pulling the wire the cover may be raised without burning the hand.

Neither do I claim a sliding stop arranged on the bail, and acting in combination with a peculiar construction of eye for keeping the bail of a culinary vessel elevated, as in the patent of Thomas H. Dodge, 1853.

I claim connecting the cover, C, with the bail or handle, B, by means of the bar, D, passing through a slot, b, in the bail or handle, substantially as shown, for the purposes specified.

[The cover or lid of this kettle is connected with the handle or bail. By moving the bail to the one side, the lid is lifted; by raising the bail to a vertical position the lid is put on, and the handle held upright—a very convenient and safe arrangement for operating the lids of kettles.]

AUTOMATIC RAKES FOR HARVESTERS—Jonathan P. Green and Israel Dodenhoff, of Bloomington, Ill.: We claim the mode described of attaching rakes to endless belts or chains, and of properly guiding the same, whereby lateral and vertical deflection of the band is prevented in operating the rakes, that is to say, hinging the rakes to the belt, C, by means of jaws, c, and projecting lips, d, when combined with guide pins, f, working in grooves, to prevent lateral deflection, while a guide bar, h, keeps the rake down to the platform in raking off the grain, all as set forth.

HAND SEED PLANTERS—Plymour B. Green, of Chicago, Ill.: I claim the combination of slide, B, catch, C, and stop, E, constructed and arranged to hold the plunger stationary until the point, K, enters the earth to a certain depth, substantially as described.

PORTABLE APPARATUS FOR GAS—James O. Halsey, of Essex co., N. Y.: I claim the air chamber, B, constructed and operating as described, to allow both the retort to be charged while the fire is in operation, and to carry off the gas that escapes from the retort, and prevent its entering the room.

COTTON CULTIVATOR—John M. Hall, of Warrenton, Ga.: I claim the combination with the wheel, P, of the adjustable hoes, i, constructed, arranged, and operating in the manner and for the purpose set forth.

HEMP BRAKES—Wade W. Hampton, of Winchester, Va.: I claim the clamping and feeding the clamped material through between the breakers, when accomplished by an arrangement of parts substantially such as set forth.

HYDRANT—Abraham Hoagland, of Jersey City, N. J.: I claim, first, the emptying the pipe, A, by a self-acting valved piston, C, with bell w rod, B, in the manner described.

Second, I claim the construction and use of the valve, D, made of an ordinary bevel winged valve, with the flexible valve, E, added at the bottom, and the cushion, F', added at the top, for the purposes described.

Third, the combination of the catch, N, upon the large friction pulley, H, with the collar, O, to enable the operator to force down, by the crank, the piston upon the valve, D, and open it against pressure, as described.

CARDING MACHINES—Hiram Houghton, of Somers, Conn.: I claim the combination of the third roll, c, with the feed rolls and lickerin, arranged substantially as described for the purpose specified.

INHALING MEDICINAL AGENTS—Alonzo G. Hull, of New York City: I claim the means of inhaling gases, vapors, and medicines treated in the manner substantially as set forth, or in any other equivalent manner.

VAULT COVERS—George R. Jackson, of Rye, N. Y.: I claim combining glasses of an inverted pyramidal or polygonal form with the sash or metallic portion of an illuminating vault cover, or its equivalent, for the purpose of producing a wider and more perfect diffusion of the light which may pass through said cover into the apartment beneath, substantially as set forth.

VENTILATING VAULTS—George R. Jackson, of Rye, N. Y.: I claim connecting the aforesaid elevated recesses in the ceilings of subterranean apartments with ventilating lamp posts, or with the flues of a building, substantially in the manner and for the purpose set forth.

SAW SET—Oliver B. Judd, of Little Falls, N. Y.: I claim the gage, E, having the jaws, F F, constructed as described, and when used in connection with the revolving plate, G, operated in the manner specified.

REEFING SAILS—Francis C. La Croix and Chauncey Barnes, of New York City: We claim reducing sails by means of "tackles" arranged as described, both ends of the "falls" of which are secured to the yard, and which are operated in the manner set forth.

BATHING APPARATUS—Louis H. Lefebvre, of New Orleans, La.: I claim, first, providing a portable frame and casing used to be placed over persons to administer baths without removing them from their positions, and attaching to said portable frame a graduating stop cock provided with a reservoir, a, to receive the condensed vapors, with the handle of said cock extending into the frame and beneath the casing, to enable the person taking the bath to operate the graduating cock.

Second, perforating the pipe or reservoir from which the vapors issue into the bath on its upper side, and placing beneath it a pipe or reservoir to receive the condensation, uniting said pipes or reservoirs by funnel-shaped connections, through which the condensed vapors may escape, as set forth.

Third, distributing pipe, B, provided with double funnels and stop cocks, for the introduction of medicated or other substances into the bath through the connecting pipe, S F, substantially as set forth.

CURLING HAIR—Mark M. Lewis, of Albany, N. Y.: I claim the construction of a hair curling instrument by the combination of a taper-formed tube with a comb, which can, by a spring or equivalent apparatus, be made to project from the surface of the tube, or withdrawn into the interior, substantially as set forth and described.

SHINGLE MACHINE—G. H. Mallary, of New York City: I do not claim any of the separate parts composing this machine when employed by themselves.

But I claim the arrangement of the several devices described, by which the bolt is sawed into shingles and planed, as set forth, the whole being combined and constructed substantially as described.

SMOOTHING IRONS—Galen B. McClain, of Bath, Me.: I claim the described sad iron, constructed in the manner substantially as specified, with its doors or flaps, d e, arranged and operating as described.

COOKING STOVES—Thomas King, of West Farms, N. Y.: I do not claim broadly the surrounding of the oven in stoves with hot air flues.

Nor do I claim the regulation of the draft of stoves by the admission of cold air into the escape flue, although I consider that my improvement is more perfect in these respects than other stoves.

I claim the arrangement and combination of the box, Q, register or pot hole, S, and flues, O P K and L L, all constructed and operating as set forth.

[The draft of this stove can be accurately regulated at all times by a register, and rapid or slow combustion produced, as desired. It has two dampers for throwing the heated current in different directions, either to concentrate the heat on one side of the chambers, (which is often required,) or to diffuse it equally all around.]

COMBINED SQUARE, MITER SQUARE, AND BEVEL—Alexander McKenzie, of Boston, Mass.: I claim the described arrangement of the try square, the miter, and the bevel blade, the latter being hung so as to project up on the opposite side of the stock from the blade, and so as to form, when set at an angle of 45 deg., a continuation of the miter head, as set forth.

DENTAL FORCEPS—J. A. McClelland, of Louisville, Ky.: I claim connecting the handles to the head pieces, c, of the instrument, by means of suitable joints and appendages, arranged in such a manner that the shape of the instrument can be so changed as to adapt it to the drawing of upper or lower teeth, substantially as set forth.

I am aware that beaks of different sizes have been fitted to a dental forcep in such a manner that one beak can readily take the place of another, and therefore I do not claim this.

But I claim combining the beaks with a dental forcep, in such a manner that their length can be increased to any desirable extent, substantially in the manner set forth.

SECURING THE DOORS OF HAY PRESSERS, &C.—Cornelius Martratt, of New Baltimore, N. Y.: I claim the form of crank or loop, E, the elliptic or eccentric form of the ends of battens, C C, and the combination of the one with the other, for the purpose of securing a door or hatch, and for the purpose of preventing a sudden and dangerous start of the door in opening, by means of the gradual movement of the battens outward, as the loop is turned off from them, substantially as described.

MOLDS FOR CASTING—Mortimer Nelson, of New York City: I claim the described method of forming molds for casting brittania and other metals, by backing up a thin metallic face with plaster, in the manner substantially as set forth.

GRINDING SAWS—Albert S. Nippes, of Lower Merion, Pa.: I claim, first, placing the roller, R, within a frame S, which is pivoted to a bar, T, which has its journals, f', fitted in oblong slots or bearings, j', substantially as shown, so that said roller may be elevated or raised up free from the saw, and also be adjusted more or less angularly with the face of the grindstone, H, for the purpose set forth.

Second, I claim operating or moving the stone, H, and roller, R, towards and from the saw by connecting the bearings, d, of the shaft of the stone, and the journals, f', of the bar, T, to the disk, D, and ratchet, C, by means of the arms, h', and the rods, E, substantially as described.

[The saw is placed in a peculiar sash in this machine, where it can be turned over, perfectly strained, and ground accurately to any thickness or bevel. There is also a compensating adjustment for adapting saws to be ground accurately, according to the wear of the stone. Means are also provided for giving the stone a lateral movement from one side of the saw to the other. It is a very ingenious machine for the purpose.]

FORMING CLAY PIPES—C. P. S. Wardwell, of Lake Village, N. H.: I claim the arrangement and combination of the respective devices described, by which the necessary and successive stoppings and startings of the piston G are effected, by which the dies, I I, are opened and again closed at the proper movements, and by which the knives, U U, are brought into action when required, all by simply moving the lever, n, up and back again in connection with the pressure of the clay against the piston, M, substantially as set forth.

SPOKESHAVES—Manley Packard, of North Bridgewater, Mass.: I do not claim applying either a wedge or a clamp screw to each start, in order to keep it in place in the stock.

But I claim the described new arrangement of the clamp screw and bow spring with respect to handle and starts of the knife or cutter, and so as to operate therewith, substantially as described.

SAWING MACHINE—H. F. Purmort, of Saginaw City, Mich.: I am aware that the blocks of saw mills have been operated simultaneously both by hand and automatically, and also reciprocal motion has been reversed, in the same, or in a way equivalent to that described.

I do not claim therefore separately the parts for effecting the purposes stated.

But I claim the sliding heads, F F, placed on the blocks, E E, and operated by the pinions, d, racks, c, pawl e, and ratchet H, and the carriage B, operated by the wheels, V X, placed on the shafts, U W, when the above parts are arranged as shown and described for the purpose set forth.

[This improvement relates to the feed motion of saw mills, and the adjusting of the head and tail blocks in feeding the log to the saw. By a single lever the feed carriage is made to receive a direct feed motion and a reverse motion—gigged back. The arrangement of the devices is very simple for effecting the objects specified.]

WASHING MACHINES—J. F. Pond, of Cleveland, Ohio, and C. L. Pond, of Buffalo, N. Y.: We make no claim to the rollers and apron,

But we claim the combination of the vibrating stop piece and its rod, p, with the screwing plate, q, and the spring bearings of the rollers, when said parts are used in connection with fluted rollers, arranged and operating as described.

DUMPING RAILROAD CARS—Wm. Pearce and John Lowrie, of Piedmont, Va.: We claim, first, the method of discharging cargo from cars by means of a rocking track, substantially as specified.

Second, We claim the mine car, as described, constructed without any openings in its sides, ends or bottom for discharging its cargo, and with its ends raised higher than its sides, for the purposes set forth.

Third, The ribs or flanges, j, in combination with the rocking track, for the purposes and in the manner substantially as specified.

Fourth, We claim the shoes, g, in combination with the projections, h, for steadying the rocking track whilst the cars are run on and off, substantially as set forth.

Fifth, The method of braking the rocking car, (as it is capsized to discharge the coal and afterwards raised,) by means of the brake, u, and wheel, s, the latter being mounted on the shaft of a pinion, v, operated by means of rack, p, and pitman, o, or their equivalents, substantially as specified.

Sixthly, We claim the arrangement of the cam stud, u, in combination with the latch bar, K, by which the doors, w, of the rocking car are released when it is brought into proper position to discharge its cargo into the chute, as set forth.

GRINDING MILLS—Ezra Ripley, of Troy, N. Y.: I claim giving to the grinding plate, F, when it is applied to a constantly revolving grinding plate, D, the positive two fold eccentric and swinging movement described, substantially in the manner and for the purposes set forth, in contra-distinction from giving to the grinding plate, F, when used with a rotary grinder, D, a simple eccentric swinging or reciprocating motion, or any other simple or compound movement heretofore positively communicated thereto in grinding mills.

HARNESS SADDLES—Palmer Shaw, of Syracuse, N. Y.: I claim making the tree of harness saddles to consist essentially of the leather cantle piece, C, fig. 3, shaped as described, connected to the raised portion of the leather fig. 1, from which the skirts D are formed, and the whole attached to the bearing plate E, substantially in the manner and for the purpose set forth.

FELTING HAT BODIES—H. L. Randall, of Roxbury Conn.: Having thus fully described my improved machine for felting or sizing hat bodies, I claim, first, the rising and falling and forward and back motions of the felting board, by a system of levers arranged as described, or their equivalent.

Second, Rotating the bat or roll of material being felted round its own axis, in the manner substantially as described.

Third, In combination with the felting board, when operated as described, the adjustable stationary stocks or carriages for holding the roll or bat, substantially as set forth.

IMPROVED LUBRICATOR—Hiram Strait, of Covington, Ky.: I claim the oil cup, X, with its sliding bottom B, thumb screw T, guides G G, in combination with porous oil bags or pieces of sponge, S, or any other porous and elastic material saturated with oil, and the spring Y, substantially as specified.

CURRENT WATER WHEEL—Thos. Stamp, of Wetumpka, Ala.: I claim so constructing a current water wheel that it may be raised and lowered, as set forth, in combination with the method described for regulating the force of current acting thereon, all arranged and combined as set forth.

WINDING CONICAL BOBBINS—Clark Tompkins, of Troy, N. Y., and John Johnson, of Roxbury, Mass.: We claim, first, the manner described, in which the speed of the winding bobbins is changed, so as to constantly draw the yarn from the fixed bobbins with uniform or nearly uniform swiftness, and thus secure more even tension on the winding yarn, and thereby make the new bobbins of more uniform density than if they were revolved with uniform velocity.

We also claim in machines for simultaneously winding a series of such bobbins, giving each bobbin spindle of the series the proper independent retreating movement from the yarn carriers as the winding progresses, by means of the mechanism described, or its equivalent for the purpose specified, in contra-distinction from giving each bobbin the separate retreating movement, by means of a fixed guide acting against the conical part of the wound yarn, and instead of making all the bobbins move endwise together as heretofore.

We also claim when the revolving bobbins in such machines are separately moved endwise by the mechanism shown, connecting each thread of yarn as it runs to a bobbin of the series with the parts which give that bobbin its retreating movement, by means of a device arranged and operated upon by the tension of the winding yarn substantially in the manner set forth; so that whenever a thread of yarn in such case breaks or runs out, the bobbin upon which it was winding at once stops moving endwise, and consequently so that when the yarn is mended, and the winding resumed, the yarn is then laid by the carriers in exactly the proper place on the bobbin without any re-adjustment of the bobbin by the operative.

And, finally, we claim the combination of parts described, whereby the rotary motion of each bobbin is stopped whenever it is laid by the mechanism described to that place in respect to the yarn carriers where the winding should end.

HARROWS—G. W. Tolhurst, of Cleveland, O.: I am aware that harrows have been made to rotate by dragging them across the field, but they always rotate in one direction. This I do not claim, my object being to cause the harrow to rotate to the right or left, the left as circumstances may require. I effect my rotation by the harrow teeth themselves, whilst in the other plans one or more auxiliary wheels are used for the rotation, which is then only in one continuous direction.

I claim the adjustable shield pieces, G G', in combination with the rotary harrow, substantially in the manner and for the purpose described.

CABLE SPRINGS—Wm. Wilcox, of East Hartford, Ct.: I am aware that surge spring relievers constructed of spiral springs of India rubber discs and the pneumatic springs separately have been used.

I claim the arrangement of the springs, c, and the springs d, within the cylinder, operating as and for the purpose set forth.

HARVESTERS—J. C. and T. G. Wilson, of Cedar Hill, Texas: We claim operating the reel by means of the rigid pin m, and spring arm n, attached to pulley l, in combination with ratchet h, arms o, and holding spring i, when said parts are arranged to operate in relation to each other, as and for the purpose set forth.

OIL CANS—Hiram Wells, of Florence, Mass.: I claim the conical cup and ball so arranged as to close the valve substantially as described, when the can is turned down to deliver the oil contained in it.

ATTACHING BOLTING CLOTHS TO REELS—John Woodville, of Chillicothe, O.: I claim forming the cloth in sections, C, and securing the sections to the reel by means of the reds, K, i, and bars C, which are attached to the bars, a, bolts, d and the bars, m, which are attached to the rim, o, by screws n, the whole being arranged as shown and described for the purpose set forth.

I further claim the bolts d, provided with the oblong and T, shaped heads, h, and washers f, when arranged specifically as shown for the purpose set forth.

[By this improvement bolting cloths are easily fitted, and firmly secured to the reel, also readily attached and detached, and they can be stretched with a greater or less degree of tension as may be required. And if one section of the cloth be injured, it can easily be replaced without removing any of the others, thus embracing considerable economy. The improvement is applicable to both silk and wire bolts.]

BLACKSMITH'S BUTTERIS—Robert Killmer and J. W. Williams (assignor to Robert Killmer), of Newton, Pa.: We claim the construction of butterises with removable two-edged bits or blades secured to a plate, A, having rectangular sides by half flanges, B B, and a thumb-screw, C, or when said sides are tapering by double flanges only, the whole being arranged and operating as set forth.

POTATO DIGGERS—John Taggart, of Roxbury, Mass., assignor to himself and Wm. W. Messer, of Boston, Mass.: I claim the combination and arrangement of the plow, the gird or grate, the revolving tooth lifter wheel or wheels, and the means of discharging the potatoes from the same.

STAVE MACHINE—Henry L. McNish (assignor to himself and D. C. Butler, of Lowell, Mass.: I claim the angular guides, e', upon the lever N, in combination with the connections, P P, and concomitant parts for adjusting the side cutters, R', R,' to dress staves of different widths, and at the same time preserving the proportion between the bilge and the width of the stave as set forth.

I also claim the V, guide e', on the bed plate for the purpose of guiding the staves in a direct line through the machine as set forth.

BRICK MACHINES—G. J. Washburn and E. H. Bellows (assignors to themselves and C. Washburn), of Worcester, Mass.: We claim, first, the method described of applying pressure to the plunger by means of the radial arms R, and levers X, operating in the manner substantially as set forth for the purpose specified.

Second, We claim the combination of the radial arms, H H, with the sliding molds, I I, and moving block or plunger P, when said parts are constructed and arranged to operate in relation to each other, substantially in the manner and for the purpose set forth.

ARGAND GAS BURNERS—C. H. Johnson (assignor to himself and J. G. Hamblin) of Boston, Mass.: I do not claim applying an air regulator or series of valves to the orifices for admitting air into the inner tube of an argand burner.

Nor do I claim separately therefrom, supporting the globe and chimney brackets by a tube encompassing the burner or outside tube thereof.

But I claim the improvement of constructing the supporting tubes of the brackets, so that it may not only sustain such brackets or have them extended from it as described, but at the same time admit the register to be operated by simply laying hold of and turning either the globe or chimney, when the friction thereof on the brackets may be sufficient for the purpose.

FLUID METRE—S. J. Burr (assignor to himself and H. F. Read) of Brooklyn, N. Y.: I claim, first, the combination of the flexible partition with shifter, o, for the purpose of opening and closing the valves or apertures, to admit and discharge the fluid, so that the apartments shall be alternately filled and emptied in the particular manner described and shown.

Second, I claim the combination of the valves, tube,

and flexible partition, substantially as described, so as to make the entering fluid discharge the fluid, alternately, in each apartment, by its pressure upon the opposite sides of the flexible partition.

Third, I claim the shifter, O, whether as set forth, or in any other form producing the same result, and placed between the two portions of the flexible partition and the packing of the tube by the outer edges of the two portions of the flexible partition, protecting shaft c, and shifter O from contact with the packing, and allowing the said shaft to work freely at the same time.

Fourth, I claim the combination of the shaft, c, enclosed in the tube f with the valve throw, substantially as described and for the purpose set forth.

RE-ISSUES.

LOOMS—W. W. Dutcher, of Milford, Mass. Patented June 27, 1846: I do not claim guiding a wagstaff by means of a rocker and stand, my invention not employing any rocker or rocking motion for each staff.

I claim supporting the wagstaff at its lower end so that it may slide longitudinally in connection with supporting it in other respects by a joint link, or its equivalent, applied so as to cause that part of the staff which strikes the shuttle to move in a line parallel or about parallel to the race beam, as specified.

And I also claim connecting the lower end of the two staffs below their fulcra, by means of a spring having an intermittent action for drawing them back, in combination with the application of a positive motion above for driving the shuttle, whereby the returning staff aids in arresting the momentum of the shuttle, substantially as described.

REFRIGERATORS—D. W. C. Sanford, of St. Louis, Mo. Patented Nov. 13, 1855: I claim the employment of an open bottom ice box or equivalent thereof, in combination with a dividing partition open above and below, so placed that by means of self operating, internal circulation, the whole of the contained air shall be kept in motion, and caused to revolve around this partition in currents moving downwards only on one side of this partition, and upwards only on the other side, when the same is combined with a chamber for the refrigeration of food or provisions placed directly under said ice-box, as set forth.

I do not claim by itself a partition dividing vertically one compartment of a refrigerator from another. Nor do I claim placing articles to be refrigerated in a descending current of air.

But I do claim placing shelves or fixtures for holding articles to be refrigerated or the articles themselves in the descending current directly under an open bottom ice-box, in combination with a dividing partition open above and below as set forth.

I also claim in combination with said shelves or fixtures so placed constructing the open bottom of the ice-box in such manner that the air may pass freely down through the same, and fall directly from the ice upon the articles to be refrigerated, while at the same time the drip of the water is prevented, as set forth.

HINGE FOR PICTURE CASES—A. P. Critchlow & Co., (assignees of A. P. Critchlow), of Florence, Mass. Patented Oct. 14, 1856: I not claim a hinge of common construction, or one having each of its leaves either bent at a right angle or provided with a tenon or projecting part, so that it may be inverted in a mortise made in the side of a case or box.

But I do claim the application of a hinge of a daguerreotype or picture case, molded of a plastic material, or made of a frangible substance or substances, such being made with each of its leaves bent twice, as set forth, and so applied to the halves of the box, that it may not only embrace two contiguous sides of such halves and be independent thereof, or not have any tenon or projection to enter the same, but may extend or lap over and be fastened to the top and bottom plates of said box, substantially as described.

SEED DRILLS—James Selby, of Lancaster, O. Patented June 19, 1855: I claim the regulating at pleasure the quantity of seed discharged by means of the transverse slides, F, or their equivalent, in combination with the reciprocating F, as shown and described.

California Bituminous Springs.

MESSRS. EDITORS—In this vicinity, and in many other places in California, "tar springs" abound, which the natives use to cover houses, lubricate axles, &c., and when mixed with sand it congeals and answers for flooring and pavements; and I think it will soon be manufactured into a burning fluid that will answer for lights, cooking, and warming our houses in cool (we cannot say cold) weather. A friend of mine is now engaged in the chemical preparation of the fluid, and has succeeded admirably, with one single exception, and that is, he has not learned to destroy the odor. He has produced a fine bleached gas, but the odor makes it objectionable.

As to the origin of the tar we are of opinion that it comes from beds of coal, and can account for them upon no other principle. Indeed, coal has been found at San Diago, and there has been some prospecting here, but it was not done on what is considered scientific principles. They dug for it on the level of, or below, the "tar springs," while I contend that the coal is in the adjacent hills or mountains; that the tar cannot violate a law of nature by running upwards. What think you, Editors? H.

Los Angelos, Cal., March, 1857.

[The "tar springs" of California, we suppose, are similar to the petroleum springs which are found in various other parts of our country, and in every quarter of the globe. There are such springs in Kenawha, Va.; at Scottsville, Ky.; Oil Ceeek, Pa.; Liverpool, Ohio., and Hinsdale, N. Y. We believe that no particular use is made of the fluid petroleum in this part of the continent, except as a lotion for bruises and rheumatic affections. It has a pungent odor, and although it can be made to burn with a pretty good light, its smell is offensive. This, perhaps, may be obviated by distilling it with some acid; we believe that this is not impossible in this age of advanced chemistry. Coal oil and kersosene possess just as offensive odors when first distilled as native liquid petroleum, and yet very beautiful oil is made from coal by the processes through which it passes for purification.

In the Burman Empire, East Indies, petroleum is obtained from numerous wells on the banks of the Irawaddy river, and is used by the inhabitants to burn in lamps. The city of Genoa, in Italy, is illuminated by gas made from the petroleum of a spring in the vicinity. Such springs are often found in places far removed from coal regions, and we are of opinion that they are sometimes found on higher and sometimes in lower situations than coal beds. The petroleum wells of New York are far removed from coal formations, and yet it appears to us that our correspondent may be correct in his surmises respecting the origin of such wells. The source of these wells may be in coal beds in the mountains at a considerable distance. The heat and pressure may distil and force the petroleum out of the coal beds, and naturally enough it will seek a lower level to escape. The artesian wells of Paris are supplied with water from a lake about two hundred miles distant in a mountainous region, and the "tar springs" of California, as well as the petroleum springs of New York may in a like manner have their source in distant coal formations.

If the offensive odor could be removed from the petroleum obtained from native wells, we believe, that a valuable and profitable business might be carried on in manufacturing burning fluid from it, not only in California, but every other place where such wells exist.

Mechanics' Halls.

MESSRS. EDITORS—As anything pertaining to the welfare of mechanics, whether as individuals or as a class, either in moral or physical progress, is of interest to the readers of the SCIENTIFIC AMERICAN, allow me to present an instance of the power and effective energy to which they can devote themselves, when rightly directed, as combined in associations for their moral and intellectual improvement. The instance I will refer to, is that of an association existing in Worcester, Mass., which, two years ago, numbered less than five hundred members, but containing men of noble parts. Feeling that the moral and intellectual demands of such an association were commensurate with the undertaking, after mature and deliberate consultation, they came to the conclusion that some kind of edifice should be erected for the use of the association, so as to contain halls for exhibition, reading and library rooms, &c., for the use of members and apprentices belonging to it. One of the whole-souled fathers of the institution whose head and hands had long been devoted to mechanics and improvements—who from a blacksmith's apprentice has risen to an honored position—generously started the "ball" with a subscription roll of $10,000, and it soon increased to more than twice that sum, thus producing a fund upon which to make a beginning. Bonds were then issued, and were soon taken up almost entirely within the association. A building was afterwards commenced, which from the furnishing of the plans to the finishing of its beautiful ornaments, were all executed by its own members, each in his own department, vieing the best to advertise his skill with the permanency of its adamantine walls. This structure now rears its noble form from the center of the city, far above all surrounding buildings—the first to attract the attention of the stranger—the pride of the city and county—and it stands dedicated to the arts and sciences, and to moral and intellectual improvement.

It was erected within two short years by a small association, then numbering less than five hundred members; it now numbers seven hundred, and is in a fair way to pay interest, besides laying up a surplus as a sinking fund with which to pay the bonds when they become due. The edifice presents an elaborately ornamented Corinthian front of 100 feet, rising from pave to apex, 86 feet, running back 145 feet in length. On the ground, besides a spacious entrance hall, there are four stores; on the first floor, a lecture room, 50 × 80 feet, library room, reading room, cabinet room, and some four or five office rooms. Over these is the grand exhibition hall, extending the length of the building by 80 feet wide, with a ceiling over 40 feet from the floor. The cost of the edifice, including the ground, was about $115,000. This sum, large as it may seem, is but the result of well directed energy, backed by a firm purpose. May this not serve as a stimulant in many circles where true energy is now latent?

Worcester, Mass., April, 1857. A. C.

Managing Boilers.

MESSRS. EDITORS—As many engineers are giving their experience in the management of steam boilers, I will give mine. I have never been troubled with priming, although frequently using muddy water. I always keep the water high, the fire even, and the steam at one point, as near as possible. Muddy water will certainly cause boilers to prime, and opening a safety valve suddenly, will also make a boiler to prime when the water is high. Steamers entering rivers from the sea are more addicted to priming than if river or sea water had alone been used in the boilers, probably from the boiling point of salt water being higher than that of fresh, thereby the salt water acts like so much molten metal in raising the fresh water into steam. Filling a furnace full of light fuel, and closing the doors quick will cause the boilers to prime. My plan of keeping boilers clean where muddy water is used, is by blowing off from the bottom, immediately after the fire is started, or two or three times before steam is raised; when steam is up, and I wish to blow off, (if the water is muddy,) I shut off the feed water five or ten minutes. By following up this practice, boilers can be kept free of mud easily, thereby preventing safety valves becoming cemented with dirt. All water should be filtered before it goes into a boiler. There is not the attention paid to this subject that its importance requires.

J. M. HARTNETT.

Waukegan, Ill., April, 1857.

Millstones—Their Speed and Setting.

From the numerous brief and clear letters which we have published on the above subject, reliable data have been obtained regarding the general velocity at which millstones are run, but the following letter seems to be complete on several points of milling, such as speed of stones, the amount of work they accomplish, and the horse power required to drive them:—

MESSRS. EDITORS—I notice by the SCIENTIFIC AMERICAN that you wish information respecting the best velocity to run 4 1-2 foot millstones. The Suffolk county mills in Boston have six runs of 4 1-2 feet stones, which make two hundred revolutions per minute; they have done complete work when grinding from eighteen to twenty bushels of wheat per hour. This mill has run successfully for the last eight years. The Pioneer Mills, Alexandria, Va., has twelve runs of 4 1-2 feet stones that make two hundred revolutions per minute, and do most perfect work when grinding eighteen or twenty bushels per hour. The balancing of the running stones, and the arrangement of machinery must be very perfect to work with satisfaction at this rate. I would recommend from 150 to 200 revolutions, according to the amount of work to be done and power employed. The result will be in the ratio of one bushel ground per hour for each horse power employed.

J. R. HOWELL.

Alexandria, Va., April, 1857.

Speed of Millstones.

A correspondent in Richmond, Ind., who has had great experience in milling and millwrighting, informs us that in running four feet millstones he proportions their velocity to the power he has to drive them. If his power is only sufficient to grind 10 or 12 bushels per hour he runs the burr stones 180 revolutions per minute; and if his power is sufficient to grind 20 bushels per hour, he runs them from 200 to 220 revolutions per minute.

How to use the Divining Rod.

MESSRS. EDITORS—I will give you some facts with regard to the divining rod and its use.

The stick I use is the twig of a sweet apple tree—it must be natural, not grafted—or whalebone, both of which must be crotched. It must be held in the hands firmly, with the elbows resting on the hips, the palms of the hands turned up; the thumbs turned to the right and left, and held tight on the end of the stick. I think it will operate better when a person is in health, than when not. It will operate only over running water. Only a few persons can use it. It will not operate in everybody's hands, but why, I cannot tell. If any one disbelieves this, send him to me, and I think I can convince them that I am correct in my assertions. ELIAS BARRY.

Saccarappa, Me., April, 1857.

[From the number of communications which we have received on the "divining rod," we cannot question the *honest* belief of a number of our readers in its virtues. There are many phenomena in nature which are yet sealed up to us, and the divining rod may be one of these; still, we must say that we are skeptics in the powers or virtues which are attributed to it. We believe that any man of a reflecting and observing mind can guess where water may be obtained by boring, without a divining rod, as well as another person with one. Our opinion may be wrong, but we cannot come to any other conclusion by reasoning on the subject from scientific data. If, however, we are at any period of time after this convinced by ocular demonstration that there is scientific virtue in the divining rod, we will frankly make the change of our views known.

County Patent Rights.

MESSRS. EDITORS—I have lately purchased a county right and machine of the patentee; now I wish to know if I have a legal right to solicit orders from other counties for the article manufactured. If you will give the desired information through your paper, or otherwise, you will much oblige,

RUFUS PORTER.

Peoria, Ill., April, 1857.

[We have frequently answered questions like the above through our correspondents column, and now publish this letter, so that our answer may be considered general "to all whom it may concern." Mr. Porter has no legal right to sell his machines out of his own county. A county patent right is the *exclusive* power to "*make, sell,* and *use*" in that county. He may take an order from another county, but he must not sell there; and the person whom he supplies cannot use the machine without the consent of the licencee of his own county.

Alloys of Aluminum.

MM. C. and A. Tissier, says *Comptes Rendus* (Paris), have communicated a short note on this subject which is of importance at the present time when the interest in aluminum which had somewhat fallen off is beginning to revive. The authors find that the valuable properties of aluminum are injured by the presence even of small quantities of other metals. One-twentieth of iron or copper make it almost impossible to work the alloy, while one-tenth of copper renders aluminum as brittle as glass. An alloy of 5 parts of silver with 100 of aluminum works like silver, but is harder and takes a finer polish. The one-thousandth of bismuth renders aluminum so brittle that it cracks under the hammer even after being repeatedly annealed. The presence of aluminum in other metals often communicates valuable properties when the quantity is not too large. Thus one-twentieth part of aluminum gives copper a beautiful gold color and hardness enough to scratch the standard alloy of gold employed for coins, without at the same time injuring the malleability of the copper. One-tenth of aluminum gives with copper a pale gold colored alloy of great hardness and malleability, and capable of taking a polish like that of steel. Five parts of aluminum with 100 parts of pure silver give an alloy almost as hard as silver coin containing one-tenth of copper, and thus permits us to harden silver without introducing a poisonous metal.

Draining the Everglades.

It is stated by some of our cotemporaries that the water so long lying stagnant in that immense tract of country known as the Everglades of Florida, has recently found an outlet through which it is discharging itself into the Gulf of Mexico. This will leave many millions of acres of dry land capable of cultivation, and well adapted to the growth of the sugar cane.

New Inventions.

Automatic Alarm for Locomotives.

Harrison's Automatic Whistler, a device which we noticed at some length on page 245 of the last volume, for sounding the whistle of a locomotive at every point on the track for which it may be previously set, was tried by an excursion on the New York and Harlem Railroad, on Thursday, the 16th, to the perfect satisfaction of a considerable number who had been invited. We accompanied the engine several miles, and from observation as well as from the assurance of the engineer who has it in constant use, are fully confirmed in the favorable opinion already expressed.

Burr Stone.

This is a quartz rock containing cells. It is as hard as rock crystal; and its peculiar value for grinding is owing to its hardness and cellular texture, which gives it a rough surface. In the best stones the solid and cellular parts occupy about equal spaces. The "French burr stones" are obtained near Paris from the tertiary formation. To make millstones the rocks are cut in wedge-shaped pancs, which are cemented and bound together with iron hoops. A cement for this purpose consists of about one part, by measure, of calcined alum ground into powder, mixed with twenty parts of plaster of Paris, by measure, made into a proper consistency with water.

Good burr stone is found in Ohio, Georgia, and Arkansas. In Ohio, at Hopewell, Richland, Elk, and Clinton, the manufacture of burr stones is carried on to a considerable extent.

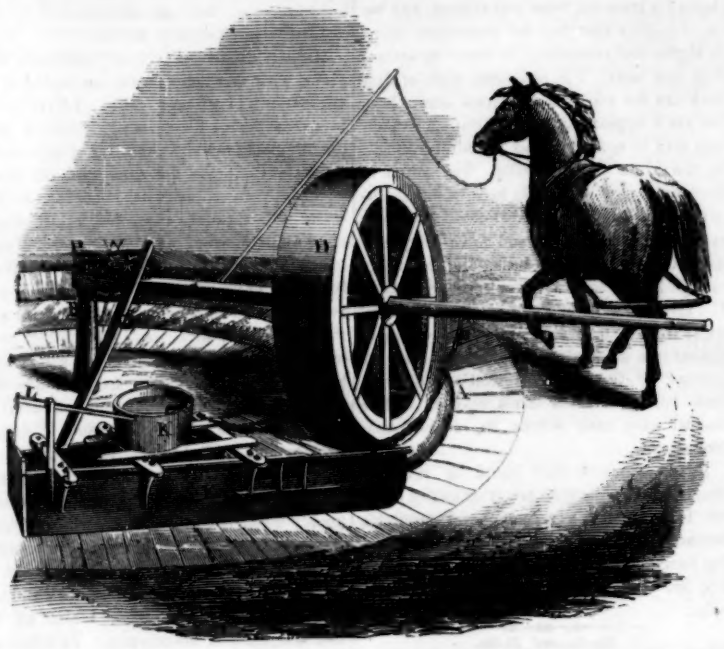
Patent Mortar Mixer.

This figure is a perspective view of a machine for making mortar, not only to supersede the severe drudgery of manual labor, but to make superior building cement. Good mortar is composed of lime and clean sand, thoroughly mixed together, and rendered into a pasty consistency. The common method hitherto pursued in mixing these materials has been by hand labor, using a hoe or a spade for the purpose. This machine is the first of its kind known to us, excepting the old pug mill.

A is the mortar-way—a path on which the materials are mixed; B is a post, like that of a horse-power shaft, rotating on a step bearing; C is a lever to which the horse is attached—it is secured to the post; D is a large roller wheel on the lever, on which it revolves as an axis. This roller revolves on the path, A spreading out the mortar, and mixing the lime and sand together. E is a drag, with two sides, which have curved runner fronts, like those of a common sled. This drag is narrow at the rear end, the runners spreading out in front; it is attached by chains, *b b*, to lever C, and is drawn round in the path, A, behind the roller. F is a door in the back end of the drag; it is raised and lowered by a lever L; K is a water tank on the drag; it has a spout and faucet in it to supply and sprinkle the lime and sand with a proper quantity of water; G is a bar attached to the cross-piece, H, on the drag, and also to the wheel, W, to which it is connected with a pin; P is a pinion fast on the top of post B, but wheel W is free to revolve. There is a small trap door made in the path, which is opened, and all the mortar when properly made forced down into a receptacle by the drag.

Operation.—The lime and sand in proper proportions are spread upon path A, the faucet of the water tank, K, is opened, and the machine set in motion by the horse moving round the track. The door, F, of the drag is then kept open until the mortar is completely mixed. The runners, D, of the drag gather up the lime and sand into a ridge; the roller D spreads this ridge out, pressing the lime and sand particles together into intimate union, and at the same time the hind end of the drag has a wabbling motion given to it by the bar, G, through wheel W, on which it is set eccentrically. It is thus that the lime and sand receive a mixing togther of a more thorough character than by hand labor. Unless every particle of sand is enveloped with a coat of wet lime the mortar is not perfectly mixed. By hand labor this is seldom, if ever effected. It is evident that such a result is easily obtained by working a sufficient length of time in this machine. After the materials are thoroughly mixed, and the mortar properly formed, the trap door, F, is shut

PATENT MORTER MIXER.

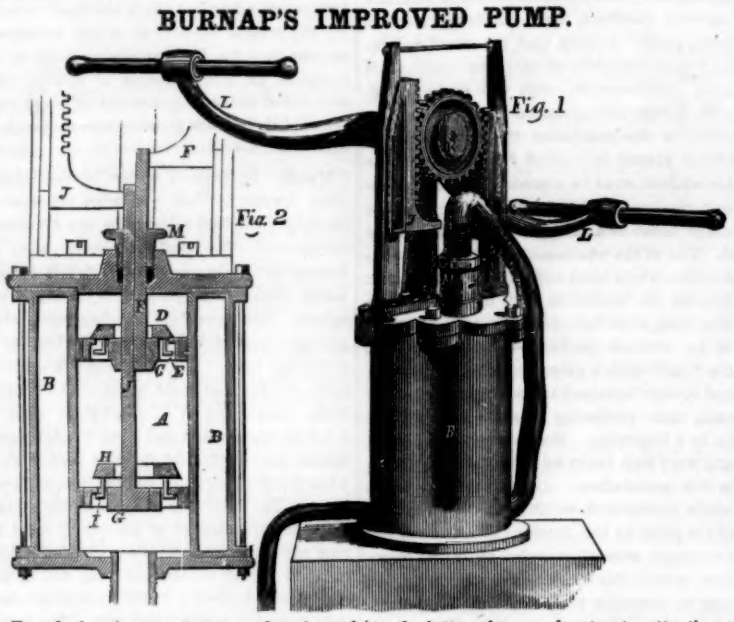


down, the drag then gathers the mortar formed into a heap, if desired, or pushes it down into the receptacle described, through a trap door in path A. The lime employed is previously slacked before it is put on the way, A. A few revolutions of the roller and drag mixes the materials.

A patent was granted for this machine to Messrs. Henry W. Hunt and John Sands on the 8th of April last year, since which date it has been fairly tested. These gentlemen inform us, that with the labor of one man and a horse, thirty casks of lime can be made into plastering or building mortar by it in one day, and that the mortar is of a very superior quality. It works as smooth as fine cement under the trowel, and it sets and hardens much sooner than common mortar.

More information respecting it may be obtained by letter, addressed either to Mr. Hunt, Peekskill. N. Y., or Mr. Sands, Armonck N. Y.

BURNAP'S IMPROVED PUMP.



Few devices in so common and universal employment are capable of such an almost infinite variation in form as the machine denoted by the simple work "pump." The absence of tools capable of boring a true cylindrical hole, and perhaps, we may add, the want of an almost equally essential requisite, cheap *iron* to be employed as material, forbade the employment of such luxuries by the ancient nations, and various expensive and troublesome "norias," "swapes," "Archimedian screws," "spirals," "chains of buckets," etc., were necessarily employed in the few situations where such could be made available.

Later days have developed almost an infinity of combinations for the same purpose, but in nearly all the "tight and easy" motion of a piston, or its equivalent, valve, or solid, playing in a smooth cavity, is a principal feature, perhaps the only feature common to the class, and entitling them to rank together. Some are for simply lifting to the spot, and others for forcing to any reasonable hight above. The pump now under notice belongs to the latter class, and attracts attention as much by its compactness and strength as by its peculiar combination of novel parts. The device was patented by the inventor, John A. Burnap, of Albany, this State, July 24, 1855.

The cylinder is upright, and is wholly or partially surrounded by an additional stout shell of cast iron. The space between this shell and the cylinder serves as a very compact and strong, and at the same time very capacious air chamber.

Fig. 1 is a view of the pump as actually constructed in practice, while fig. 2 is a section copied from the patent drawings. Both are identical in their general features, but this explanation will account for any discrepancies in the details. In the section, for example, the air chamber extends quite around the pump proper, while in the other it is confined entirely to one side, it being found by experiment that ample space to fulfil all the conditions required could be thus obtained.

A is the cylinder or pump proper; B is the surrounding air chamber, while C and G are two similar buckets or boxes, worked alternately by means of the racks and pinion, J F and K; the pinion, K, being reciprocated by power applied to the lever, L. The connection between the boxes C and G, and their respective racks above is made by the rods, F and J, which latter are half round, so that when fitted together for use their flat sides work in tight contact each with the other, and the exterior or cylindrical sides of both are packed by one set of packing in a single stuffing box, as shown.

D and H are annular or ring valves, which cover series of ample holes in their respective boxes, C and G; E and I are metallic hooks which serve to prevent the possibility of the valves becoming far separated from their seats, however quickly the pump may be worked. M is the point to which the discharge pipe or hose is attached, and the air is compelled to remain in the air chamber by the insertion of a pipe at M, reaching down nearly to the bottom of B, and by receiving the fluid only through this tube. Further information may be obtained by addressing Burnap & Bristol, 36 Liberty street, Albany, N. Y.

Protection of Telegraph Cables.

The accident to the cables connecting Great Britain with France and Belgium, detailed on page 213, this Vol., by the dragging of a ships' anchors across them in a gale, resulted in a total suspension of all telegraphic communication between the British Islands and the Continent for fifteen days, making thereby quite a serious derangement of the ordinary course of many kinds of business. It appears highly desirable, if practicable, to make provision for withstanding any strain which might be thrown upon these important cables by such contingencies. As the anchors of a ship under such circumstances continue their hold upon the earth, itself almost sufficient to hold the vessel, it would appear that a degree of strength sufficient for this purpose might be afforded by some practicable means. In this instance the cables actually employed—hemp cords, protected by a coating merely of stout wires—sufficed each to hold the ship from half an hour to an hour; and a correspondent of the London *Engineer* proposes to make an addition of one or more heavy chains to lay alongside, or near each cable, the combined strength of which would probably hold any vessel which might ever chance to seize it. That paper, which, by the way, is better illustrated and printed than edited, objects that such a line would afford so capital an anchorage that captains could not resist the temptation to anchor on it, and thus the conducting cord would be continually disturbed and abraded. But when we consider the extreme difficulty, in fact, the impossibility, of a vessel ever again recovering an anchor which might once become hooked around such a group of heavy cords, the conclusion is unavoidable that except under very extraordinary emergencies, navigators, wreckers, and every one else, would avoid the cord as if it were infected with the "seven years' itch;" and we conside th idea quite a valuable one. The chain—for one would probably be sufficient—secured at its outer end by a heavy anchor, would be exposed to no wear of importance, and might be galvanized so as to quite effectually preserve it. It would only require to be laid in comparatively shallow water.

For lines of such extreme importance and cost, for example, as the great transatlantic one, such a chain, or a score, if of advantage, should be provided for each end wherever it approaches shallow water. The line, as shown in our diagram of March 14, (page 516,) is intended to keep northward of the great fishing banks on approaching the coast of Newfoundland; and finally, to enter a deep and obscure bay, both of which circumstances will diminish the chances, but will not absolutely prevent the possibility of disturbance by anchors. As intimated in our description of that date, the slender mid-ocean cable will be replaced by a strong one at both ends of the line; but the great amount of money thus "sunk to the bottom of the sea,"—a term once expressing a most hopelessly lost investment—makes it important to attend to every possible precaution against losing either end of the great metallic nerve, so expensively constructed and located.

Scientific American.

NEW YORK, MAY 2, 1857.

Galvanized Iron.

Sheet iron coated with zinc is known by the above name. We suppose it obtained this title from having been first produced by the galvanic battery, a very different process from that now employed in its manufacture. What is the object of coating iron with zinc? Iron is the cheapest of all metals, and possesses great strength and flexibility, thus rendering it adaptable for a vast number of purposes, but it has the defect of actually rotting or burning slowly when exposed to a moist atmosphere, owing to the great affinity which it has for oxygen. This is the reason why its surface requires to be protected to prevent it rusting or oxydizing when exposed to the weather, and zinc is perhaps the best protector yet discovered. Tin and copper metals having a lower affinity for oxygen than iron, have been employed to coat and protect it, but they are not suitable for this purpose. By the laws of electrical affinities, when two different metals are in contact and in presence of water or moisture, the negative, under ordinary circumstances, is protected at the expense of the positive metal. The latter is the metal which has the greatest attraction for oxygen; the negative one the least. Tin and copper are negative metals to iron, but zinc is positive, and this is the reason why it is a superior protector. Although an oxyd of zinc quickly forms on the surface of galvanized iron, yet as it is not very soluble in cold water, and does not readily wash off with rain, but adheres to the surface and shields the metal like a paint. Zinc is therefore a good, and it is also a cheap protector for sheet iron exposed to the atmosphere. For this reason it need not excite surprise that galvanized sheet iron, wire, &c., have come into such extensive use during the past few years.

A number of patents have been obtained for coating iron with zinc and various other metals, but so far as we know, only one of these is successfully in common use—this is the patent of E. P. Norwood, issued in Great Britain, May 3, 1843, and in America, Sept., 1844. This process of galvanizing iron imparts that crystaline appearance to it which resembles some kinds of japanned work. The iron to be coated with the zinc is first cleaned to remove all scale or oxyd from its surface. For this purpose it is immersed in dilute sulphuric acid, and scrubbed with sand and emery until it is quite bright, and is then washed in water.

The iron is now covered with a thin pelicule of tin, which is precipitated from a solution of salts of tin as follows:—A quantity of the "salts of tin," (about a pound to the five gallons of water) are dissolved in water in a tub or vat, and into this the cleaned sheets of iron are immersed and brought into contact with pieces of metallic zinc at top and bottom. In a very short period a thin skin of tin is found adhering to the iron, something like that of copper which forms on the blade of a knife when dipped into a solution of blue vitriol. The sheet of iron is now lifted out, and dipped carefully into a bath of molten zinc, the surface of which is covered with a thin stratum of pulverized sal-ammoniac. In every case the iron must be kept but for a short period in the molten metal, or it will be injured and rendered brittle. The sheets of iron thus coated with zinc are afterwards passed between rollers to smooth their surface.

The galvanizing of iron has been conducted under this process at the extensive works of Marshall Lefferts, in this city. One day after the date of this number of the Scientific America—May 3d—this patent expires and the process becomes public property.

Finding that we cannot enter into further details of this subject, without extending this article to an undue length, we will return to it next week, and describe other processes and other useful applications of zinc and iron, which will be found of great use to mechanics and manufacturers in every department of the useful arts.

Wants of California.

A correspondent writing to us from Los Angelos, California, states that there are two openings in that county for branches of the arts which will make a permanent business, and prove profitable. "The locality," he says, "is one of the choicest spots on earth, as it regards climate and good fruits." These latter involve the requirements of the two branches of business alluded to. They are glass making, and the manufacture of pottery ware. The glass will be required for wine bottles, as that section will yet supply vast quantities of wines, the grapes being of a superior quality, and yielding wine surpassing that which we now import from Europe. There is no glass manufactured at present in California, and there is but one pottery furnace in operation, and that is in the upper part of the State. Preserved fruits will yet constitute an important business in Los Angelos, and great quantities of earthenware vessels to contain them will yet be needed. In the latter part of our correspondent's letter, he says:—

"We, no doubt, have plenty of men in the State acquainted with the manufacture of the articles, but they are here seeking a hastily gathered "pile," and intend "going home to enjoy it;" if they fail in these anticipations they retire broken down and useless. We want men to come here to reside permanently, with their families, and engage in works that will ensure comfort, and riches too, if the means be properly and steadily used. The time to make "piles" by magic, as it were, has passed in California. They have to be made now by a permanent arrangement."

The natural resources of California are of the most varied, rich and inviting character, but heretofore they have principally attracted those thither who did not intend to make that country their home. Some of the most ingenious, skillful, enterprising and scientific spirits from all parts of the world have been drawn there, and numbers of them have now made it their future home; but a great many more of the *right sort* of emigrants, such as our correspondent describes, are still wanted.

Scientific Farming.

The great mass of agriculturists in this country, as also in the world, may be divided into two classes. The first great class, containing all but about one in a thousand, are content to go on in the ways of their grandfathers. They *understand* farming fully; they are *practical* farmers. These men add nothing to the knowledge, and but little to the wealth, either of themselves or of the world at large. They can be disposed of in very few words. The other class are enthusiasts; and under the heading which we have laid down for this article would branch gloriously into a dissertation on salts and sub salts, soils and sub-soils, acids, gases, and improved machinery. The road is equally simple to them, but it is a very different one from that of the class referred to. Class No. 2 holds that all farmers cultivate too much ground; that none plow deep enough; that none manure strong enough; that none bestow sufficient attention on fences; that none plant trees and vines enough; that none have sufficient regard to sustaining the power of the soil; and, in short, that none are sufficiently mathematical, chemical, and, generally speaking, abstrusely scientific in their operations. They would induce farmers to subscribe for every agricultural periodical, read every book, attend every fair or agricultural lecture, and become perfect walking dictionaries in their familiarity with the names and opinions of all chemists and alchemists, from the discoverer of Glauber salts down to the manufacturer of Paine's gas.

In practice, however, it happens almost invariably that these scientific farmers lose, rather than gain, by their own farming operations, and this fact cannot be considered too significant. There is an extreme in this business as in every other, and whether the matter be viewed in an abstruse scientific light, and mathematical formulas and equations be developed to show the state of affairs; or whether we take, in ordinary language, the simple term "judgment," as expressive of the element desired, the fact is indisputable that the truth lies between the extremes, and is a very difficult matter fully and properly to be arrived at.

Rotation in crops is desirable; but how often the crops should be changed with every variety of soil, and with every conceivable ratio of the cost of labor, as compared with the value of the products, is a matter extremely difficult to determine. Rotation involves extra labor. To change pasture to tillage, and this again to meadow, is far more expensive than a continuation of either condition; and the truly wise farmer ascertains, or judges as accurately as possible, the point where the conflicting considerations actually meet. Planting trees is most assuredly a good investment in general; but a farm all orchard would necessitate a great expense for fertilizers, and a long and patient waiting for a return. Guanos and artificial manures are, in many cases, highly profitable; but unfortunately the knowledge of soils and the capacity to describe them so that every farmer may determine for himself precisely what is wanted, and how much, on his land, and the actual pecuniary result, is yet far from being effected. Improved machinery is highly advantageous, but it is easy to be led into the expenditure of too much, and to be most egregiously imposed on in such devices.

While we are thus free to admit the possibility, in fact, the strong temptation, in those of progressive minds to invest largely in science at the expense of practical results, the great disproportion in the two classes first referred to must be borne in mind, and each reader may ask himself which of the two classes he most probably ranks in. A perfectly reliable and infallible judgment would call for a far larger amount of cultivation per acre, and a greater expenditure for fertilizers and machinery than generally obtains. The mass need no checking in this respect, but the few who do are most likely to be found among the readers of this journal.

Having sufficiently pointed out the danger of overdoing in science, we may the more heartily urge the old grannies to their duties. It is true that *nearly* every farmer cultivates too many acres of land. It is true that few farmers avail themselves so fully as is profitable, of the improvements of the age, either in fertilizers, cultivation, rotation, drainage, irrigation, harvesting, or curing. Thousands, yes, millions of dollars are annually lost to the country and to the world through the ignorance and obstinacy of farmers, which a very few dollars of time pleasantly applied to the reading of a still fewer dollars worth of information, would have entirely avoided; while at the same time the obtuse mind of the hard-fisted laborer would have been expanded and developed, and his capacity and means for enjoyment greatly increased. Store, then, the mind with facts, and diligently cultivate the judgment to discriminate. If reapers and harvesters, ditching machines, sub-soil plows, experiments in drainage, etc., cost too much to be expedient for one, club together the neighboring farmers, and make a purchase or experiment. Form associations for mutual comparison of data; quicken your perceptions by rubbing together ideas, and multiply your experience by giving others the benefit.—Neighboring experiments, where soils, climates, and distances from market are necessarily very similar, are far more valuable in practice than distant ones, which may be paraded with more ostentation. Do not look for *immense* results in any experiment. It is unfair to ignore progress unless the results are three or four-fold the old method. Do not expect a gain of more than ten per cent., all things considered; but if this can be accomplished every year, or even once, without again retrograding, the result is sufficient to make all the difference between profitable farming and absolute bankruptcy.

If you have cattle to consume it, the Chinese sugar cane may be planted, and very possibly with good effect, as green fodder; but do not, we beg you, expect to make sugar, or even respectable molasses, without elaborate and expensive machinery, and a reasonable amount of care and enlightened experience. The Chinese potato is very different in this respect, and may ultimately be of great value as food for man, or as a root to store for winter use in feeding; but a score of experiments in a town are very nearly as good as a thousand, and far better, unless the thousand are properly conducted. There are some whose tastes incline them to such efforts. Aid such "martyrs to science" in experimenting, and compare notes carefully on the results; but do not each spend half the summer in tending these strange plants, covering the joints of the vines, etc., to find at the year's end that you have been *almost* successful.

We have in mind nothing which we care to designate particularly as an imposition on the farming public; but although interested parties are always crying *immense* results, the farmer who expects such from any one step may generally be set down as a deluded man. There are those who are wide awake to speculate in novelties; but the great mass must be content to accumulate by carefully and skillfully grouping together almost trifling economies, with a view to produce the greatest possible quantum of finished goods, at the least possible cost.

American Pearls.

"Like Orient pearls at random strung."

No line of poetry has been more often quoted than the above, but we fancy it will now have to be crowded a little to the one side for "American pearls in Jersey found." Various kinds of precious stones have been found in the United States, but until now, no pearls, so far as we know.

A few weeks since, a pearl was discovered by accident in a fresh water shell-fish near Paterson, N. J., and since that time quite a number have been obtained, and no little excitement caused thereby in the neighborhood. Some of these pearls have been exhibited in one of the largest jewelry establishments in our city, and for size and beauty they are not inferior to those of the Orient.

Pearls are found in several kinds of shell-fish—both marine and fresh water. They are principally composed of lime and the gluten of the fish, are very beautiful, and have been used as ornaments since the earliest ages. There is a delightful play of colors on their surfaces, caused by very delicate groovings—which require a microscope to detect—polarizing the rays of light. From the scarcity of genuine pearls the larger ones have sometimes sold at very high prices.

Artificial pearls are manufactured to a considerable extent (so it is said) in Paris, from the scales of a small fish called *ablette*. Small hollow glass globes are first made, and their interior is lined with a coating of these fish scales, mixed with a solution of isinglass as a vehicle. In appearance they resemble pearls as near as glass brilliants resemble diamonds. The genuine American pearls are found near Paterson in a small creek, the waters of which are supposed to have something to do with their formation, as none have been found in the same kind of shell-fish in other creeks.

Sewing Machines.

It was our expectation one year ago that before this time, some of the ten dollar sewing machines would have been so perfected as to have come into pretty general use and worthy of recommendation. But such has not been the case. In answer to a great number of inquiries, we would say that while many improvements have been made and patented within twelve months past, as yet no particularly cheap machine has been introduced which we can recommend to purchasers for family use. Wheeler, Wilson & Co., Grover & Baker, or I. M. Singer & Co., and some others, make good machines costing from $75 to $150, which we would recommend to purchasers instead of any of the very cheap ones that we know as being yet in the market.

The Pacific Wagon Road

The Pacific wagon road provided for at the last session of Congress will soon be under way. The Secretary of the Interior, we understand, is prosecuting with vigor the arrangements for its construction. It is to be divided into several sections under the control of separate superintendants.

The Desjardins Bridge Catastrophe.

The failure of a timber bridge employed to carry the Great Western Railroad over the Desjardins Canal at Hamilton, in Canada West, on the 12th of March last, and the consequent precipitation of the locomotive *Oxford* and a part of a passenger train through the flooring, to the depth of sixty feet, with a loss of many lives, is a fact more or less familiar to all our readers. Three civil engineers were examined at considerable length before the Coroner's jury, to determine the construction and the degree of safety of the bridge. The construction was a timber truss, built by Mr. Whipple, of Albany. The bridge was three years old, and had been well protected by paint. The material broken was pine timber, the fracture commencing, so far as we learn from the evidence, in the needles or cross-timbers of the flooring, but subsequently extending to the side trusses. The span of this bridge was seventy-one feet eight inches.

Every bridge, as well as every other construction, requires to possess a surplus of strength. According to the testimony of Anthony Sherwood—an engineer on the Buffalo and Lake Huron Railway, who had been employed three years on the London and South-Western, in England, and for some time on other railroads in Great Britain and Spain, part of the time as chief engineer—the structure, taken as a whole, possessed a maximum strength of 429 tuns; while the greatest weight that could be applied by the heaviest train that could be loaded upon it was 98 tuns. By the maximum strength of the bridge is meant the strain under which the chances would be equal, whether it would break or resist, and the 429 tuns are assumed to be equally distributed over the whole length.

Andrew Talcott, chief engineer and superintendent of the Ohio and Mississippi Railroad, and previously employed as chief engineer on several other American roads, estimates that if equally distributed, the bridge would bear 272 tuns, or would bear 136 tuns put on the center; while the greatest load that could be put on it, by coupling two of the company's heaviest engines, could not exceed seventy-two tuns.

Mr. Whipple, the designer of the bridge, who has devoted his whole attention to bridge-building for fifteen years, calculates that 570 nett tuns, equally distributed, would not even endanger the safety of the construction, unless the material be supposed considerably inferior to the average quality of its kind. Having made this *calculation*, however, he does not *think* that the bridge would sustain that weight. His opinion is that the bridge would sustain a weight of between 400 and 500 tuns. He also considers that the greatest weight that could be on the bridge at any time is about 72 tuns.

We give these figures because they contain very important facts with regard to the surplus of strength in bridges, and also to show how in estimating the strength of constructions, as in everything else, the most learned doctors disagree, though not, in this case, so seriously as in many others. Sherwood, of English and Spanish experience, says the superabundant strength required in England is but two and a half to one—that is if a bridge was ever to bear fifty tuns in any emergency, it must be able to bear one hundred and twenty-five tuns; and engineers grumble even at this, and say it is far too much. There was a great deal of discussion concerning a bridge in England which would bear, by calculation, only two and one-fourth times what it was actually required to bear.

According to most of the witnesses, the superabundant strength of the Desjardins bridge was fully four or five to one. The train was of very ordinary weight, and was moving slowly—at a rate of less than seven miles per hour; and although one of the Brunels (the great English engineers) has affirmed that he would rather go over a dangerous bridge at eighty miles an hour than at ten, common consent seems to indicate a superior safety in traveling slowly; and if the theory adopted in explanation of this accident be correct, it is preeminently so.

The floor of the bridge was not planked over, and the cross-timbers and rails are found scratched a trifle by the train before reaching the point ruptured. An axle of the locomotive truck was found broken, and the theory is, that this axle broke before the breaking of the bridge, and was the original and sole cause of the accident. Occurring while the engine was crossing the bridge, or before it entered on it, the wheels became displaced, the truck turned on its pivot, and threw the locomotive off the track, so that it fell with an immensely accumulated force against the naked timbers, and cut them off like a cannon ball, ripping a hole which the other cars successively enlarged as they were precipitated through. Axles, unfortunately, are liable to break at any moment; and the rather startling conclusion arrived at by the scientific witnesses is, that no timber bridge would stand the impact of a locomotive leaping off the track upon it. The impact of the *Oxford*—by no means an extraordinarily heavy engine—in striking the timbers with a perpendicular descent of one foot, and a forward motion of seven miles per hour, or ten feet per second, was estimated by Mr. Sherwood as equal to a dead weight of 324 tuns applied at that one point, while the maximum strength of the floor beams or needles was only 21 1-2 tuns each. This calculation, coupled with the above, presented facts relating to the surplus of strength in the bridge, taken as a whole, seems to indicate a hopelessness of attempting to make a floor sufficiently strong to resist such contingencies. But the bridge in question was of a very rare construction, the only similar one being employed to cross the Welland Canal near Thorold, and it is quite possible that the floor timbers were very weak in proportion to the strength of the trusses, especially in their resistance to a lateral force, such as that produced by the forward motion of the engine. Had the floor timbers been something stronger, and the bridge planked over, it is probable the accident would not have occurred—at least, not in the same manner; but the engine might, in that case, have run off through the latticework of the side, and still have dragged the cars with it, or broken down the structure, by so much diminishing its strength, although there would be a strong chance of uncoupling. It would seem highly desirable, on this account, to strongly plank over the floors of all timber bridges. Every consideration should induce the construction of a strong railing at the sides of all high bridges, with a hope that such might effectually check the side motion of such car or locomotive as might be thrown off the rails at those dangerous points.

The Secret of Success in Tempering Tools.

A correspondent, D. I. Wells, of Bolivar, Tenn., writes us a few words respecting tempering steel tools. He says:—"I read the communications in No. 27 SCIENTIFIC AMERICAN, from three different persons on tempering mill picks, neither of whom gave the true method as I understand it, although one comes very near to it. The main thing in tempering is striking the right heat. From long experience, I have found that the lowest tempering heat at which steel will harden when taken out of the fire and dipt into water is the best. A little experience with any piece of steel will show this to be so, and different kinds require different degrees of heat. It is a mistake to suppose, that by raising the temperature of steel for tempering very high that it will become harder, and of a better temper. Steel is rendered more brittle by a high heat, but no harder. As to the chilling medium, I know of nothing better than clear cold water."

These views of our correspondent agree with those of one of the most skillful and experienced English steel makers—one who stood in the very first rank in Sheffield, and who is now known here as one of the best judges of steel in our country. He told us, in conversation, that every kind of steel required a different degree of heat in tempering, but the lowest heat possible was the best, and the very finest steels required the lowest.

A telegraph wire insulated with spun glass cord has recently been shown to us as being well adapted for marine cables. Glass is superior as a telegraph non-conductor to gutta percha.

Notes on Science and Foreign Inventions.

Wheelbarrows—Numerous canals have been dug in various parts of the world, and thousands of miles of railroad have been constructed; in their excavations and embankments tens of thousands of sturdy *navies* have sweat and toiled from morn to eve in wheeling their barrows, and yet, it seems, none of them ever thought of improving this ancient "mancart." Was it owing to the odiousness of *caste* attached to it that it seemed beneath the notice of our Yankee utilitarians? Five or six years ago, when an emigrant made the overland journey from Missouri to California, hurling his baggage on a wheelbarrow, this implement was raised to a very dignified position, and yet no improvement in its construction was the result. Even the sweat expended last autumn by the gallant Major Ben. Perley Poore wheeling a barrel of apples sixteen miles into Boston, in payment of a bet on the last election, resulted in no change in the appearance, dignity, or uses of this peculiarly democratic means of transportation.

Antoine Andraud, of Paris, with a mind alive to the very general use of the wheelbarrow, and noticing its defects, has secured a patent for improving it. Instead of using one wheel, he employs two in his improved barrows. The nave or hub is formed to receive two wheels, each placed in such a position as to suit the object or work for which the barrow is to be employed. When it is not intended to dump its load, the wheels are situated wider apart; this gives greater stability to the barrow, preventing it from being easily tipped over. Barrows required in cities for wheeling books, &c., should all be constructed on this excellent principle. When the barrow is designed to be upset with its load, the wheels are set near together, and the body of the vehicle built over them, so as to diminish the weight of the load on the arms of the person who moves it. The body of the barrow and the position of the wheels underneath may thus be so arranged as to be favorably balanced, whereby a much heavier load may be moved with greater ease than with a common barrow.

Treating Oils and Fats.—George Hutchinson, of Glasgow, Scotland, has obtained a patent for treating the above materials with acids and alcohol. The fats or oils are placed in a wooden or earthenware vessel, and sulphuric acid poured among them very cautiously, and well stirred, so as to avoid carbonizing the oil or fat. They are then allowed to stand for about two days, when new products are formed; these are sulpho-oleic, sulpho-margaric, and sulpho-glyceric acids.

These acids are all soluble in alcohol, a suitable quantity of which is now added, and sulpho-glyceric acid subsides. More alcohol is now added, when the two remaining fatty acids undergo decomposition combinations of meta-olic and meta-margaric acids, with some free alcohol present. The fats must be melted prior to being treated as described. The process is for a purifying of the oils and fats to remove the glycerine and thus to produce stock for superior hard candles.

Water of the Putrid Sea.—At a recent meeting of the London Geographical Society, in a paper by Captain Osborn, R. N., on the geography of the Sea of Azoff, he said that the Putrid Sea presented a remarkable contrast to the Sea of Azoff. Its waters are clear and blue, and so extremely salt as to irritate the skin. The offensive smell of the Putrid Sea he attributes to springs of naphtha, occasioned by volcanic action, of which there were several indications. Though that sea has obtained from its smell the name of "Putrid," residence on the coast is not unhealthy, and an analysis of its water does not show it to possess any noxious properties.

Hardening and Coloring Soft Stone for Buildings.—L. Jacquemier, of London, has taken out a patent for rendering common gypsum rock (which will not stand exposure to the weather) hard, and for coloring it, to fit it for building and other purposes, so as to withstand exposure to the weather. The improvement is thus described in the London *Engineer*:—

"The object of this invention is to change the character of alabaster and of gypsous rocks, and to render them like marble. Gypsous rocks prepared in the manner hereafter described are no longer susceptible of being easily broken or injured by hard bodies, and they are not liable to absorb dust or other matter which would discolor them; on the contrary, various tints can now be given to them, and they will take a polish like marble, resemble marble, and may be used for all purposes of decoration and objects of fancy.—The invention consists in exposing alabaster and other kinds of gypsum and calcareous stones and earths, to a heat of about 212° Fah., in order to expel and drive off therefrom the watery particles contained in it. The time during which the gypsum must be exposed will vary with the nature of the material, but experience will soon dictate the precise time to the operator. When sufficiently dried, or when the aqueous particles have been driven off, the gypsum is plunged several times in succession in clear water at the temperature of the atmosphere, or in any other suitable hardening liquid, or substance, or composition, reduced to a liquid state, and when the operator finds, by experience, that the plunging has been continued for a sufficient length of time, the gypsum is withdrawn, and exposed to the atmosphere to complete the hardening process, which requires from five to thirty days, more or less, after which the gypsum is in a fit state to be polished and treated, in all respects, in a manner similar to marble, which it will be found very much to resemble. In fact, by operating upon gypsum in the manner described, an artificial marble is produced. In order to color the gypsum, any suitable coloring material may be mixed with the water in which it is plunged after the drying process, but the colors most preferred are those produced from minerals reduced to a state of solution, some of which (as, for example, sulphates of iron and copper) not only impart color to the material, but also harden it additionally. The method of hardening and coloring hereinbefore described with reference to gypsum may also be applied to all calcareous stones and earths."

Gypsum is a composition of lime and sulphuric acid, and is abundant in various parts of the United States, being known by different names, on account of its peculiar appearances, these being nearly as varied as those of marble

Near Lockport, N. Y., beautiful *selenite* and snowy gypsum are found in limestone. Alabaster occurs in the Mammoth Cave of Kentucky, resembling flowers, leaves, shrubbery, and vines. Massive gypsum is found in abundance in New York, from Syracuse west, accompanying the rocks which afford the salt brine; also in Ohio, Illinois, Virginia, Tennessee, and Arkansas.

Nova Scotia gypsum is ground up in mills and employed principally for sowing on clover fields and pasture lands. Plaster of Paris is gypsum, calcined and ground up into powder. As this rock is very abundant, and of little worth, if the process of M. Jacquemier really renders it as hard and durable as common *freestone*, the invention is a valuable one, for gypsum can easily be carved and cut into any form.

Peruvian Bark.

Quinine is a household word in every South American Indian family. The natives of Peru are accustomed to look on fever as one of the common incidents of life, and it is their specific for such diseases. The supply of quinine is decreasing, while the demand for it is always increasing. It is now used in medicine, not only as a remedy for actual fevers, but as a prophylactic.

Camlet.

There are several varieties of such fabrics, and although they are common it is not so generally known of what materials they are composed. Some are made of goats' hair; in others the warp is of hair, and the woof half hair and half silk; others, again, are entirely of wool, and in some the warp is of wool and the woof of thread. There are striped, watered, and figured camlets.

A cotemporary states that owing to the present high price of leather, the Philadelphia boot and shoe manufacturers have determined to make an advance in the price of boots and shoes of twenty per cent. on the cost of the work.

J. R. H., of Pa.—To enable us to get up suitable engravings of your water wheel, for publication, it would be necessary for you to send us a working model or the Letters Patent. We should like both model and patent, but can dispense with the latter better than the former, unless the drawing attached to the patent should contain a perspective view. The expense of the engravings would probably be about $15, and that amount would cover the publication also, as we make no charge for inserting engravings of meritorious and new inventions; such as do not possess either of these virtues we cannot lumber up our columns with, under any consideration.

C. C., of N. Y.—We would recommend you to have a preliminary examination made of your invention at the Patent Office before applying for a patent. We can have this done through our Branch Office in Washington, and will send you a carefully prepared report in regard to the probable success of an application. This examination will cost only $5, and may be the means of saving you the expense of an application. We recommend inventors generally, who intend to apply for patents, to adopt this course. We have the best of facilities for prosecuting these examinations, as you will perceive from our circular of information sent you. The circular will be freely sent to all who may wish for a copy. It contains useful instruction to inventors and patentees.

S. C. H., of Wis.—Worix's pump was a simple spiral or volute curved pipe, which, being moderately rotated, dipped up the water at its periphery and discharged it at its center. A small coil only some four feet in diameter, may, by this means, be able to force the water to the hight of 50, or even 100 feet. A syphon cannot raise water higher than 32 feet. The gentleman you refer to, who states he saw a syphon carry water over a hill 100 feet high must be mistaken; probably he means a hydraulic ram.

J. S. C., of Baltimore.—The pressure of water is just in proportion to its perpendicular hight. A column of four feet exerts four times the amount of pressure on its foot as a column of one foot high. Regnault's Chemistry will give you information on the expansion of gases. We have a branch office in Washington.

J. B. M., of Ga.—Sand is employed in welding iron, to prevent oxyd forming, which would render the metal incapable of welding. Felspar may answer the same purpose, as it contains 68 parts of silica.

C. W. J., of Wis.—The steam pumps so well known and in such general use in this region, are direct-acting steam engines having no cranks. See the engravings of Guild & Garrrison, page 105, this Vol., Scientific American. Send a model of your device, or a drawing and accurate description, and we will inform you of its patentability.

M. H., of Pa.—Get a treatise on dialing, and it will impart to you all the information required respecting the shadows cast by the sun from perpendiculars.

H. H., of N. Y.—The fine polish on steel instruments to which you refer, is given by burnishing them with agate stones manufactured for the very purpose.

H. H. T., of Mass.—Heated and compressed air in a tight vessel will burst it—like steam—whenever the pressure becomes greater than the cohesive strength of the vessel.

J. H., Jr., of Ohio.—Many farmers now unload their hay and grain from wagons in their barns, by machinery, consequently a machine embracing this object merely is not patentable. We advise you and all our farmers to adopt this plan.

"Gas."—Wm. G. Ross, of St. Nicholas Mills, above Quebec, Canada, has in use an apparatus for lighting his mills, made from rosin. It does not operate with satisfaction; he is, therefore, desirous of getting something more simple and economical.

J. W Terry, of Walhalla, S. C., wishes to purchase the best mill for grinding oak bark, to be operated by water power. He also wants the best machine for riving and shaving shingles.

B. D. Berry, of Edwardsville, and John Milner, of Greenfield, will please inform us in what State they reside, as we wish to address to them a communication.

H. H., of Boston.—The pianoforte patent to which you refer, has, we understand, been recently sold in England for $10,000. Your improvement being apparently a good one, there is no reason why you should neglect to secure an English patent for it. The patent above referred to was not secured by the inventor in England. Some one took it without his consent; therefore he has lost the benefit arising from the sale of his own improvement.—The English law grants patents to the introducer as well as to the inventor.

J. M. W., of N. Y.—The Ambrotype Manual is published by J. M. Fairchild & Co, this city.

W. W., of N. J.—A circular saw made in sections is stated to be less liable to buckle than a saw of a single plate, and if a section be broken it can easily be replaced. The saws made of single plate are generally preferred, however.

P. M., of Ill.—We sometimes, at the request of correspondents, direct the attention of ventors to "new inventions wanted." Those, therefore, who have machines for supplying such wants should take proper measures for bringing them before the public by having them illustrated, that their merits may be made known to all, and that the public may judge for themselves.

J. J. C., of Md.—In the latest edition of "Brewster's Optics" the stereoscope and the magic lantern are described.

T. J. C., of Ga.—You should try and perfect your saw governor so as to make it self-acting. Give the matter your attention, and you may yet produce the valuable improvement you desire.

J. J. B., of Ky.—The claim of G. W. Fulton for hydraulic propulsion is limited to a combination of pipes for discharging the water, and for an arrangement to reverse the current. Without drawings you could not understand the nature of the invention.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, April 25, 1857:—

J. D. M., of Conn., $25; A. W., of Pa., $55; W. E. Jr., of Ill., $55; G. & Co., of Ill., $25; C. W. & Co., of Pa., $250; S. & T., of Conn., $25; R. W. B., of Pa., $25; H. & G., of Mich., $30; C. M. Y., of N. Y., $25; A. P., of N. J., $25; W. H. McN., of N. Y., $250; S. L, of L. I., $30; D. S. McN., of N. Y., $55; P. E. H., of N. Y., $25; W. A. J., of La., $45; W. G. C., of N. Y., $250; C. A. P., of N. Y., $63; T. S. W., of N. Y., $50; J. A. D., of N. Y., $10; C. H. T., of L. I., $30; I. A. R., of Mass., $30; L. F., of Mass., $27; E. T. L., of N. Y., $30; N. T., of Me., $30; A. C. B., of Conn., $50; T. P, of N. Y., $270; G. & I., of Va., $10; E. F, of Ill., $27; W. E., of Ill., $25; J. L. S., of N. C., $30; S. R. H., of N. Y., $100, A. C. C., of Mich., $30; C. D., of N. J., $20; E. B. B., of N. Y., $30; C. S., of N. Y., $25, B. I. L., of Mass., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, April 25, 1857:

J. D. M., of Conn.; W. Y. G., of Ky.; T. B., of Mass., (2 cases); R. W. B., of Pa; E. B. B., of N. Y.; C. S., of N. Y.; C. M. Y., of N. Y.; A. P., of N. J.; J. N. W., of Ill.; B. I. L., of Mass.; G. I. M., of Conn.; T. S. W., of N. Y.; P. E. H., of N. Y.; D. S. D., of N. Y.; A. C. R., of Conn; L. F., of Mass.; J. W., of Ky.; W. E., of Ill.

Important Items.

☞ COMPLETE SETS OF VOLUME XII EXHAUSTED.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers previous to January 1st (No. 17) are entirely exhausted.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post of fice at which they wish to receive their paper, and the State in which the post office is located.

FOREIGN SUBSCRIBERS—Our Canada and Nova Scotia patrons are solicited to compete with our citizens for the valuable prizes offered on the next volume. [It is important that all who reside out of the States should remember to send 25 cents additional to the published rates for each yearly subscriber—that amount we are obliged to pre-pay on postage.]

PATENT LAWS AND GUIDE TO INVENTORS.—This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office. Price 12 1-2 cents per copy. A Circular, giving instructions to inventors in regard to the size and proper construction of their models with other useful information to an applicant for a patent, is furnished gratis at this office upon application by mail.

RECEIPTS—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

PATENT CLAIMS—Persons desiring the claim of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying.

INVENTORS SENDING MODELS to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies, either through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them.

Subscribers to the SCIENTIFIC AMERICAN who fail to get their papers regularly will oblige the publishers by stating their complaints in writing. Those who may have missed certain numbers can usually have them supplied by addressing a note to the office of publication.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

Science and Art.

Electricity for Discovering the Seat of Disease.

Dr. Holland, of the New Grafenburg Water Cure Establishment, Oneida county, N. Y., informs us that he has made use of electricity as a remedical agent during the last ten years, and has reduced it to such scientific principles that he readily describes every form of disease, without interrogating the patient. He makes the patient take hold of one pole of the battery, and himself the other, then he passes his hand over his body, forming the circle, and thus by the peculiar sensations produced, discovers the seat of disease.

Fall of a Suspension Bridge.

The iron suspension bridge which spans the Genesee River at Rochester, fell on the 21st ult. from the weight of snow on it. The bridge was only finished last summer, and cost over $28 000. It was constructed between iron towers standing on the banks. They were built of cast iron cylinders, bolted together, and standing on high banks, 235 feet above the water. The road-way was 200 feet above the water, and proceeded in almost a straight line from the top of the high bank on one side, to the other. The cables were 780 feet long, and the entire length of the bridge was over 700 feet. It was calculated to sustain a weight of 2,000 tuns. It spanned the Genesee river below the Falls. The metal, it is stated, appears to be defective. The load that was on it when it fell did not amount to 100 tuns.

The Frigate Niagara.

This, the largest and believed to be the best of the new steam frigates, made her trial trip last week. With all sails set, and the screw making 36 revolutions per minute, she made eleven knots per hour. It is reported that with steam only, she ran at the rate of 10 1-2 knots per hour, with 42 revolutions of the propeller; with 32 revolutions, her speed was seven knots per hour. The *Niagara* has sailed to England, and will assist in laying down the Transatlantic Telegraph Cable. Thus far she has not done any very extraordinary feat in sailing or steaming; her machinery is new, but it is hoped she will yet give a better account of herself.

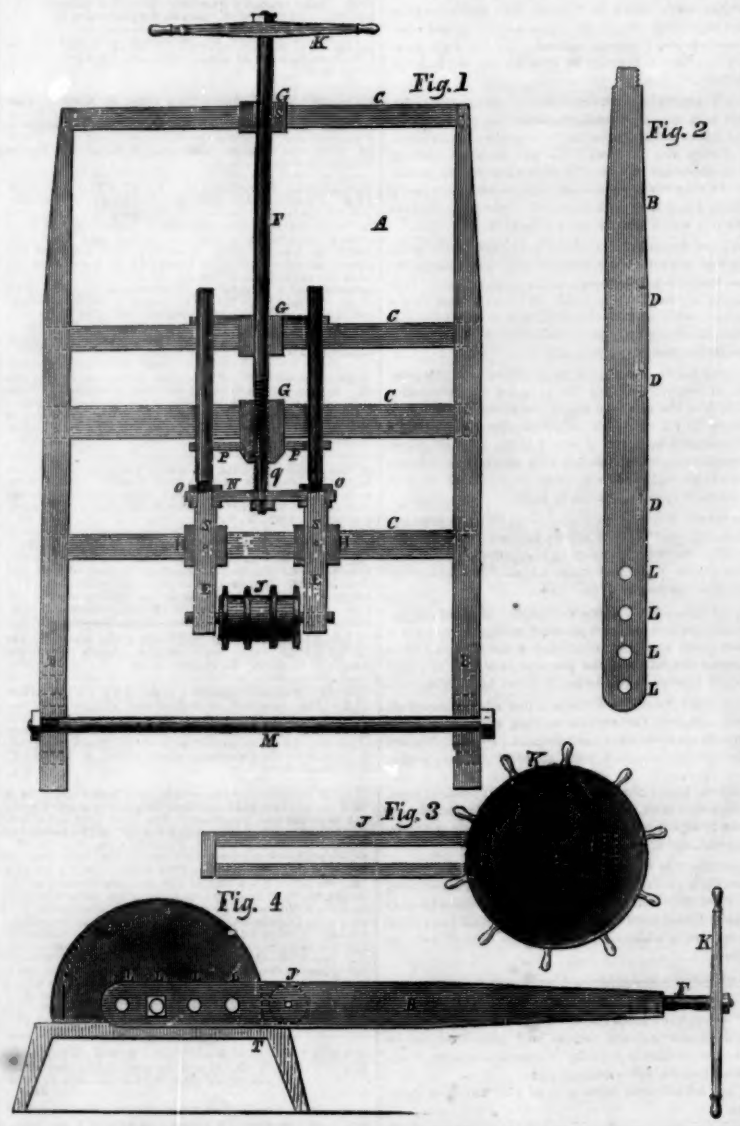
Sarven's Patent Wood Bending Machine.

The bending of wood and causing it to retain its bent condition as tenaciously as if it had grown in that form, is a feat every day performed in the ordinary course of many varieties of business, but means for producing exactly the desired curve in sticks so constrained are far less common, if indeed they have before existed in any convenient and really practicable form. In the most common of such devices the sticks are simply subjected to a sufficiently strong transverse strain, and so held, and by this means the wood, if uniform in strength and rigidity, will bend into a tolerable approach to the arc of a circle, or more strictly into the figure termed in mathematics "the elastic curve," the bend being greatest in the middle and diminishing toward each end. Other forms may be approximated to by applying the forces at different points, but the device here illustrated is a systematic, rapid and convenient means of compelling sticks to assume precisely any curve desired, whether regular or irregular, and to retain such flexure until cold. For this as in every other bending device, it is necessary first to boil or steam the wood, a process which destroys its "life" somewhat, and injuriously affects its durability, but both these effects are comparatively slight, and the heat and moisture appears indispensable to the bending, as also to the retaining of the shape after the bent form is attained. This machine is not intended for very large stuff, and therefore has no such provision for end pressure as are found in some of the machines for bending heavy sticks, which we have before noticed.

A patent for this machine was granted to the inventor, Mr. James D. Sarven, of Columbia, Tenn., on the 20th of January last. It is adapted to bending fellies for wheels, bows for carriage tops, shafts at heel, poles, seat pieces, sleigh runners, sleigh fenders, goose necks and body pieces for sleighs, plow handles, and in short curves of any ordinary description that lie in a plane.

Figure 1 represents the bending fram consisting substantially of side lever bars, B B, and plated cross bars, C C. Figure 2 is a side view of lever bars; D D are recesses to receive the cross bars; one cross bar directly opposite the other, allowing space between for the roller guides, E E, and regulating rod, F, to move from one side of the bending frame to the other, carrying with them the roller, J, by means of the slides, G G and H H. Figure3 is a top view of bending frame, showing the hand wheel, K, at one side; L L are openings in side lever bars, on either of which points the frame is made to revolve, according to the size of the mold, or the curve it is desired to egive the timber; J is a bending roller, of which there is a series, made smooth or with any desired number of flanges, according to the number and size of pieces to be bent at one operation, by which means every piece is bent perfectly true, being free from windings to one side or the other. E E, figure 1, are roller guides which can be detached when it is necessary to remove one roller for the purpose

SARVEN'S PATENT WOOD BENDING MACHINE.



of inserting another by nuts, O O, figure 1. F, figure 1, is a regulating rod passing through a threaded slide nut, G, a corresponding thread being cut on the rod, by which means the bending roller is raised or lowered by turning the hand wheel, K. S S, figure 1, represent thumb set screws, which prevent all lateral play of the slides and bending roller while the timber is being bent.

Operation.—Figure 4 shows the mold upon which the timber is to be bent; B is the bending frame pivoted at the point represented by the square in working position; the thumb screws, S S, figure 1, being tightened, the ends of the prepared material is inserted at T; the hand wheel, K, is now turned till the roller, J, presses firmly against the timber, the frame is then made to revolve around the mold until the timber is bent to their ends, which being fastened, the hand wheel is turned to loosen the roller, J, from pressure, the frame is turned back to its former position, the thumb screws loosened, and by pressing with one hand gently against the roller guide, and the other against the regulating rod, the roller is moved off the bent timber, the thumb screws are again tightened, and another set of timbers inserted and bent. These operations are repeated until the mold is filled with bent timber, the machine is then removed and can be applied to any number of molds required, but when the curve is not regular, as represented by the dotted lines, it will be necessary, while the machine is revolving, to turn the lever wheel, K, in order always to keep the timber firmly pressed against the mold, by which means any irregularities in the mold may be overcome. If used in combination with a revolving mold, or a mold operated in any other manner, it performs equally well, and it may of course be placed either in a vertical or horizontal position.

From the peculiar construction of these machines, which admits of their being made of a size equally adapted to large or small establishments, their ready adaptation to all kind of wood, and the rapid manner in which they execute, it gives them advantages never before attained, to say nothing of their comparatively small price. A machine for the very highest class of work costing only $50, from this upwards, according to size and capacity and number of rollers. A $50 machine can be carried under the arm of a man having a tolerable good stretch in that direction. These machines are now in practical operation, and each machine guaranteed to perform as represented. For extra heavy work any desired power may be employed. All correspondents inquiring about machines, will please state the precise kind and quantity of timber they wish to bend.

Any other information desired may be obtained by addressing the patentee, as above.

Telegraph Cable Across the Hudson.

We know of no "suspension bridge" for any other purpose so light and long as the one which carries the electric fluid across the Hudson river at Fort Lee, in the upper part of this city. The proprietors of the various telegraph lines connecting New York with Philadelphia and the South have expended $50,000, to $75,000 in erecting very tall masts on each side of the river at these points, stayed very firmly by wires extending in all directions landwards, and from their tops their wires are stretched at such hights as to clear the masts of vessels and the funnels of steamers on the river between. The clear span or stretch between the masts is about one mile. The wires so strained are of course liable to break with every severe gale, and there has lately been laid, in addition to one large cable, several years in use, two stout cables crossing at a point considerably below, judged to be better suited for the purpose. This indicates an increasing preference for this method of crossing rivers with important telegraph lines.

To Make Yellow Ink.

This ink, sometimes useful in making pen and ink sketches, is prepared thus:—Take French berries, (a yellow berry sold by druggists), one ounce; alum half an ounce; rain or distilled water, half a pint; gum arabic, quarter of an ounce. Boil the whole together for about eight or ten minutes, then strain through fine muslin; when cold, it is fit for use. The berries may be obtained from drysalters.

Metholated spirit is a mixture of nine parts of alcohol and one part of wood naphtha.